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EDITORIAL.

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Paris, April 15, 1914.

SUB-CUTANEOUS TUBERCULOSIS.—In human medicine, this question, it is well known, has been the subject of many communications, and the object of thorough study. In veterinary medicine, on the contrary, it is considered as very rare, but about fifteen cases are on record.

At one meeting of the *Société Centrale de Medecine Veterinaire,* a very valuable paper was presented by Veterinarians Ch. Perard and G. Ramon where the sub-cutaneous tuberculosis of bovines was treated at some length and where the attention was called to this peculiar manifestation, which includes the lesions of the hypodermis and those located between the fibres of the superficial muscles.

The macroscopic aspect of these alterations differs from that of classic tuberculosis, and on the contrary are closer either to that of cancerous diathesis or of sporotrichosis or of blastomycosis. The microscopic and bacteriologic diagnosis is as difficult to make as the macroscopic.

Named *tuberculids* in human medicine, those lesions have been explained by various theories. They are due to rare virulent bacilli, coming from a deep visceral center, or to bacillar remains free or inclosed in leucocytes, or again to embolies of bacilli weakened and of little virulency or even of dead bacilli.

The writers have observed animals during life. The skin was studded with nodosities of different forms, varying between

the size of a pea and that of a hen's egg, and were particularly located on the upper region of the body, the neck and the shoulder. These nodosities were hard, painless and sometimes adherent to the skin.

At the post mortem, the subcutaneous tumors were found with their irregular form and their various distribution, some were adherent to the skin, most of them were on the surface of the superficial muscles or between their fibres.

On a section of their tissue the most frequent appearance was that of a homogenous firm tissue, white-yellowish, sometimes with darker punctiform spots, or again showing right across more or less irregular bands, radiating and resembling the caseification, called radiated by Bongert.

Sometimes nodosities no bigger than a pea were found that showed in their center softened caseous matter or again undergoing caseification. They are the type of caseous nodules. A third variety of lesions intermediate to those two types may also, with them, be found on the same animal.

The lymph glands corresponding to the regions invaded by those lesions may be tuberculous, but most generally they are free from disease. In the cases observed by Perard and Ramon these tuberculids co-existed with lesions in the lungs and of some lymphatic glands and internal organs.

The histological constitution of these nodosities varies very much and careful examination is required to be certain that they are lesions due to the Bacillus of Koch. The presence of the bacillus in frottis and upon sections of tissues has been negative with the authors and experimental examinations were unsatisfactory.

Altogether, these lesions, as far as their structure and the point of view of virulency, resemble those of subcutaneous tuberculosis of man; and compared with the lesions ordinarily found in bovine tuberculosis they form a special group by their macroscopic and microscopic aspect and also by their variable inoculability.

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INFECTIOUS PARAPLEGIA.—In one of the reviews that Prof. Cadeac, of Lyon, so frequently publishes in the *Journal de Zootechnic,* the learned writer treats of this disease, which has presented to us so many points of resemblance with the affection that is so frequent in the States and that is known under a different name, that I felt an analysis of the professor would prove of unusual interest.

Under the name of infectious paraplegia must be understood a disease, with enzootic aspect, observed in solipeds (horses and mules) characterized clinically by paresia or paralysis of the hind quarters and anatomically with congestive and hemorrhagic changes in the spinal cord.

The history of the affection is somewhat recent, and it is not until 1885 that it is described successively in France, Germany, Sweden, Denmark, Italy and in India.

The disease essentially consists in a toxi-infection of the spinal cord and of its envelops.

The microbian agent has been described as a small bacillus, a micrococcus by Blin and Lambert, as a colibacillus by Thomassen and as a steptococcus by Schlegel, Zwick and Perrucci. This last is the only one where the pathogenous action has been studied. It is found in the urine, in the serosity that infiltrates the genito-urinary organs, in the blood, the spinal cord, the marrow of bones, and the parenchymatous organs. Once in the organism it gives rise to a spontaneous streptococcy, which is propagated by natural contagion and is transmissible by inoculation.

Artificially, the paralysis of the hind quarters and all the troubles of infectious paraplegia of horses can be reproduced in small animals. The injection of massive doses of culture of the microbes in the venous system of horses gives rise only to a temporary weakness of the hind quarter, and yet 10 cubic centimeters in the jugular have been followed by the appearance of the disease with Perrucci, and repeated injections of small doses has with Zwick given rise to infectious paralysis.

The natural infection takes place by the genito-urinary apparatus and the digestive canals.

The contagion occurs through the bedding of the animals and the tools used for them, sponges, curry combs, etc. Diseased animals infect rapidly those round them. The transmission may take place at some distance in large gatherings of horses.

The introduction in a stable of a piece of the carcass from an animal that had died a natural death and which had been soiled with infected urine was followed by the development of the disease in that stable.

Mares are more frequently affected than horses, as their genitals are less protected and the introduction of the germs can take place more readily.

While the genital organs form probably the best door, the digestive canal is also an important entrance for the microbe.

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The introduction and propagation of the microbe, according to its localization give rise to three forms of manifestations, hence three forms of disease, the *bulbar*, the *brachial* and the *lumbar*. The period of incubation seems to be short; animals being taken from one or four days after the exposure to an affected animal.

Without febrile indication, only a slight dullness, an unwillingness to move and then appear the symptoms of the various forms.

In the *bulbar*, dull and lazy to move, the animal is stiff and has a staggering walk. He stands quiet in his stall, the head down, eyes closed and remains insensible to all excitement. From the first, there is labio-glosso-pharyngeal paresia, mastication and deglutition are difficult. Soon after one or two days, these symptoms of paralysis are well marked; the respiration becomes slow, the pulse almost imperceptible, the disease becomes generalized, the horse lays down and dies between 24 hours and 2 or 3 days without convulsions.

In the *brachial* form the horses, as they come out, move their forelegs with less freedom, like foundered animals; they stumble, fall on their knees. They sometimes get up of themselves, but again may have to be raised. Gradually, however, the branchial forequarter is completely taken and is followed by the invasion of the hind legs.

With the *lumbar* form, the first symptom is the paresia of the hind legs. The horse, while at rest, seems to be in perfect health; as soon as he is moved shows inco-ordination of his movements, the hind legs tremble, the horse has a staggering walk, the fetlocks flex, the toes of the feet scrape on the ground, trotting is impossible. The loins are very sensitive to pressure. The tail is flaccid and motionless. The urine is expelled, cloudy, viscous, not tinted red brown as in hemoglobinuria.

In horses the sheath is swollen, the penis hangs out; in mares the vulva is oedematous and the vagina congested.

With either of the three forms, the disease may have a similar development, very rapid, striking, or acute, or, again, subacute.

In the rapidly striking, death occurs in a few hours by general intoxication of the whole nervous system.

The acute may last from 24 hours and not longer than three days. With it also, a fatal termination is the rule.

In the sub-acute, the symptoms gradually subside, sometimes rapidly, and the animal appears in convalescence. Yet if he has been kept in slings one must be careful not to be too hasty to take them off entirely, as relapses are very frequent. This sub-acute form generally lasts 8 or 10 days.

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The lesions are limited to the vagina and bladder in the lumbar form at the outset of the disease, but they rapidly extend and become generalized. The spinal cord and the envelops are congested more or less in the lumbar, brachial or bulbar region. There are also secondary general lesions.

The diagnosis is based on four principal signs: Paralysis of the hind quarter, cloudy viscous urine, swelling of the external genital organs, contagiosity of the disease.

In spontaneous cases, it may be sometimes difficult to differentiate the disease from hemoglobinuria, but the condition of the genital organs and the absence of hemoglobine in the urine are characteristic of the paraplegia.

Epizootic cerebro-spinal meningitis resembles infectious paraplegia very much, by its contagious nature and the absence of hyperthermia, but it is distinguished from it by the convulsive contractions of the superior cervical muscles and by the general troubles.

The prognosis from any point of view is always serious.

The treatment is prophylactic and curative. Isolation of the sick, disinfection of locals, stables, change of bedding, etc., etc.

Curative treatments of various natures have been recommended and left aside. The use of slings, when possible, is always to be recommended. Bleeding has done good. Boric irrigations of the bladder, injections of artificial serum, polyvalent antistreptococcic serum, caffeine, ether, nux vomica, strychnia, etc.—but almost always have given negative results.

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Auricular Catarrh in Dogs.—As writes Prof. Hebrant in the *Annales de Medecine Veterinaire,* the inflammation of the internal face of the external ear, of the concha, more commonly known as auricular catarrh, whether its origin is parasitic or of other nature, is not always limited to the superficial part of the skin nor to the portion which can be explored. In other words, all the cases are not only localized catarrhal affections. There are causes which may render the extent of the diseased process, may modify its depth and may in fact be the result of diathesic influence as for instance the herpetic diathesis. In such condition, it is easy to appreciate the difficulty in obtaining a rapid and lasting recovery.

Complications are not uncommon, and Prof. Hebrant calls the attention to three principals, which are important to bear in mind.

First, the *inflammation of the external auditory canal* and of the membrana tympani. It generally occurs in neglected cases or in those which are rebellious to treatment. The inflammation, developed by continuity of tissue, promotes a circular swelling, a repletion of the glands which secrete more abundantly and whose products dry up and close more or less the passage of sounds. Sometimes pus drops into the canal, collects, reaches the tympanum, which is macerated and perhaps ulcerates.

In another condition *there is formation of polypy growths in the bottom of the external ear.* This frequent complication is the result of chronic dermitis, developing on the papillary elements of the skin. In all the cases or auricular catarrh, there is a local swelling of the skin, due to interstitial exudate; and when it is abundant it may give rise to an increase in the size of the irregular folds of the bottom of the concha and thus obstruct it. This local swelling often remains, a true chronic dermitis, frequently observed even after the recovery of the original trouble.

The third condition referred to by the Professor is the *inflammation of the cartilage of the concha itself,* and in relation to it there is mentioned the case of the dog which had that peculiar chondritis in both ears. The concha was such that the bottom of the cartilage was completely obliterated and the dog completely deaf. The dog was a pointer—his condition rendered him perfectly useless.

Both ears were very thick, painful and the auditory canal completely obliterated, the circular cartilage forming a perfect hard ring. The concha at that point was several centimeters thick, adhering to the lining skin. That of the outside surface being loose over it. The amputation of the cartilages was the only way to relieve the deafness of the animal. This was done by the dissection of the cartilage, saving the external cutaneous covering. The wound of the left ear cicatrized after two weeks,

but that of the right had profuse granulations which demanded peculiar attention and probably left lesions on the membrane tympany. At any rate, the result was complete in one sense, as hearing could take place by the left ear and the dog able to perform his duties.

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STERILITY IN COWS.—In the *Deutsche tier, Wochenschrift*, Doctor Gebauer, Veterinarian, calls attention to this subject and to the ovarian operation which is recommended against it.

Notwithstanding the publications of Hess, of Zschokke and of Schumann, where was recommended the enucleation of the Corpora Lutea to overcome sterility of cows, this operation is still little practised by veterinarians because it is not known or again because they had no faith in it, by want of sufficient statistics.

For the author, however, it is an operation easy and beneficial, which is bound to enter current veterinary practice. He has himself performed it several hundreds of times.

The indications are given by the exploration of the ovaries. Dr. Gebauer examines systematically: 1. Any heifer which has passed the second year without having shown manifestations of being in heat. 2. In stables where sterility prevails, all cows served since eight weeks about, whether or not again in heat. 3. Any cow which, about two months after calving, is not yet again in heat.

It is sufficient to introduce the right hand in the rectum to easily detect the presence of the two ovaries and feel them with the pulp of the fingers without it being necessary to pull them backwards. It is thus permitted to recognize if they present abnormal protuberances, answering to persisting or hypertrophied corpora lutea or again to cysts. The ovary is then seized in the hollow of the hand, so as to bring the morbid elevation on the pulp of the thumb, and it is squeezed with the index against it. The corpora lutea is thus expelled from the

ovary, or if it is a cyst, it is burst. There remains then a small cavity where the end of the thumb can be introduced. It must be remarked that cysts are rare and that it is almost always that corpora lutea, hypertrophied and generally single, that are easily enucleated.

The operation is simple and one can readily make himself familiar with it in practising on fresh ovaries of cows killed. Following this method, there are no risks of tearing the ovary.

Rupture of the cysts is without danger. When corpora lutea are present, it is good after their enucleation to apply over the ovary moderate pressures for a few seconds. If, exceptionally, hemorrhage should occur, hemostatic injections are resorted to. Ergotine has been used successfully twice by Gebauer.

Sixteen cases are recorded then with their excellent results. Thirteen of these were in cows which without being pregnant had not been in heat since several months; after the operation, ten became in season after 4-19 days; nine of them were fecundated after a few coverings and one after the second; eight had a normal parturition. The three remaining became in heat respectively the 34th, the 50th and the 90th day after the operation. They were fecundated.

Ovarian squeezing is a simple operation that veterinarians can use with benefit to them and to their clients.

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Nervous Lesions in Intoxication by Worms.—Nervous symptoms, sometimes very serious, have for a long time been observed in subjects infected with worms, and yet there exists no anatomopathological description of the nervous lesions found in man or in animals that died because of the helminthiasis. At any rate, one has rarely the opportunity of making the post mortem of one where death was exclusively due to an intoxication from worms, which most commonly is complicated with a secondary infection. In such cases it would be difficult,

when considering the lesions found to select the part played by each of the morbid factors.

Mr. Rachmanow, in the laboratory of Dr. Weinberg, of Pasteur Institute, has written for the *Annales of the Institute* an article where he relates the experiments that he was called to institute, while thinking that the study of the nervous system, in the experimental intoxication by worms, could determine if the toxines secreted by the worms were truly able to promote the formation of nervous lesions and to what point the nervous phenomenas observed in man and animals carriers of helminths could be said to be caused by the action of these parasites.

In the *Annales de l'Institut*, the writer states that he has made three series of experiments. In the first, he examined the central nervous system in the direct intoxications; in a second, he treated the indirect intoxications or the anaphylaxy by worms; and in the third the condition of the nervous system in serial anaphylaxy was considered. From the experiments the following conclusions were drawn:

1. The central nervous system of guinea pigs does not always react in the intoxication by worms. Nervous lesions are not found in this animal except when he presented during life more or less serious clinical symptoms. Some individuals may resorb products from worms without presenting the slightest nervous reaction.

2. The lesions that are observed in the acute and sub-acute intoxication are on the nervous cell, the neuroglic cell and upon the fibre of the white substance. Besides the different degrees of chromatolysis, the nervous cell presents often a large number of sinuous canals hollowed in the whole thickness or in a part of its protoplasm. In severe cases, the nucleus is displaced towards the periphery of the cell and shows a deformed nucleolus. The neurofibrilla are preserved in light forms of intoxication, but in severe cases they disappear.

The neuroglic cell offers the various stages of the " amiboid " transformation; it keeps its form, but its nucleus becomes pycnotic, or again it takes the aspect of the amiboid cell of

Alzheimer. There is also found, especially in cases of chronic intoxication, an abnormal collection of neuroglic elements round nervous cells (phenomenas of neurophagy). In the same conditions the fibres of the white substance are also altered; they are tumefied, but in an irregular manner.

3. The lesions of the brain and spinal cord in anaphylaxy by worms are very small or do not exist, if the guinea pig dies with very acute anaphylactic shock in three to ten minutes. They are, on the contrary, very pronounced if the serious anaphylactic phenomena have lasted some time, half an hour or more. They present the same characters in both the acute or the chronic intoxication.

4. The lesions of the central nervous system observed in animals, anaphylactized with horse serum, are exactly similar to those of the anaphylaxy by worms.

5. As the lesions of the nervous system are much more marked and frequent in the anaphylaxy by worms than in the direct intoxication by the parasitar products, it seems probable that the nervous phenomena, sometimes very severe, as for instance, symptoms of meningism, observed sometimes in some helminth carriers, must be considered as being of anaphylactic nature. A. L.

THE GLANDERS QUESTION.

Glanders, like the poor, is always with us, and from what we can learn, has always *been* with us. But is it always to *stay* with us? Sometimes we think so, when we find that we are gaining so little in our fight against it in the big cities. For some time the watering trough has been conceded a prolific source of contagion, and many new kinds of troughs have been recommended to overcome the danger of contamination of the water; but glanders has continued on the increase despite these precautionary efforts; the probable reason being that the *improved* troughs have not overcome the danger; the contamination remains. That has brought us face to face with the realization that the only way to

remove the danger of contamination of glanders from horse to horse through the watering trough is a very radical measure, *i. e.*, the removal of the watering trough. That has been done in Minneapolis with a striking diminution of the cases of glanders in that city. It has been found necessary to do it in Philadelphia, where glanders was found to be on the increase; it has either been done, or about to be done, in Jersey City, N. J., and a strong movement is on foot in New York to substitute the trough by the faucet. This movement was started by the Grand Jury of Bronx County. Some of the members of said Grand Jury having lost a number of valuable horses from glanders had a committee of this Grand Jury make a personal investigation of some of the public watering troughs of the Bronx, which resulted in the presentment which follows:

To Honorable John J. Brady, Justice of the Supreme Court of the State of New York, in and for the County of Bronx:

We, the members of the Grand Jury of the County of the Bronx, for the April Term, 1914, respectfully present as follows:

We have heard the complaints made as to the prevalence of the infectious disease of glanders, so dangerous to the animal life of the County, and more particularly to the horses thereof and so ravaging in its effects.

Our investigation briefly has disclosed the fact that six of our commercial houses in our County have within three months lost sixty-eight horses through the disease and in each case the inception of the disease in the stables of the persons complaining was traceable to the existence of the public horse-watering troughs in the County. These troughs, as is well known, exist on street corners and are used by horses which are then without the knowledge of the owners and drivers suffering from this dread disease. The water becomes infected, is covered with slime, filth, and spreads contagion broadcast amongst the animals.

These street fountains are in addition a source of great waste of water and in that way of great expense to the City. They cause blockades of our street traffic.

The Commissioner of Agriculture of the State of New York has advised us that glanders is not alone costly to the owners of the horses, but also to the State, which is compelled annually to spend thousands of dollars in butchering horses apparently well but glanders-stricken.

We are also informed by competent witnesses that it is the practice and habit of push-cart peddlers and truck-cart vendors to dip pails of water out of these troughs and with the water thus obtained to sprinkle their merchandise.

Thus it will be seen that the disease is even a menace to the public, irrespective of the horse owners.

For all of these reasons we are of the impression that all further maintenance of these germ-breeding and disease-carrying troughs is a menace to the community second to none, and more particularly by reason of the approach of the heated season.

We respectfully recommend that a copy of this presentment shall be forwarded to the Board of Aldermen of the City, the Commissioner of Health of the City, and the State Commissioner of Agriculture, to the end that proper steps may be taken for the eradication of the evil.

We recommend that these troughs shall be abolished and in their place and stead erected hydrants or pumps with automatic shut-offs, and that each wagon driver desirous of watering his stock shall be compelled to carry with him a pail for that purpose and that purpose alone.

Dated, April 23, 1914.

A copy.

JAMES V. GANLY,
Clerk.

LEVI A. WARD,
Secretary.

F. A. WURZBACH,
Foreman.

This presentment has stirred into activity many bodies of men who have the horse interests and the welfare of the public close to their hearts. Through it the Board of Aldermen of New York City introduced an ordinance to abolish watering troughs and substitute automatic shut-off faucets, and compelling all horse owners to equip vehicles with pails from which the horses of that vehicle must be watered. This ordinance was referred to the Health Committee of the Board of Aldermen, where it still was at the time of this writing. A later meeting will be called at which all parties interested will be given an opportunity to discuss the question. Further evidence of the activity aroused by the *presentment* is shown by the fact that a conference was called on May 20th at the office of the Lincoln Safe Deposit Company in New York, at which there were present, representatives from the Van Owners' Association, from the American Society for the Prevention of Cruelty to Animals, from the Women's League for Animals, from the Horse Owners Association, from the New York City Board of Health, and from the New York State Department of Agriculture. Dr. Emerson, Deputy Commissioner of Health, presented the sanitary side of the question in a manner that convinced his auditors; and finally, as a result of this conference a committee was appointed to confer with the American Society for the Prevention of Cruelty to Animals. As soon as this organization, and other similar ones, understood that the intention was substitution, not mere abolition on the part of those who are endeavoring to check the spread of glanders and protect public health, any opposition that they

may have previously felt seemed to disappear, and their co-operation is anticipated. Especially as the substitute can be shown to be far superior to the old method in supplying water to tired and thirsty animals, while not exposing them to the dangers of contagion that exist under the old method. Among the advantages of the faucet system over the trough (leaving aside the question of contagion altogether), is the saving of time, as a fountain that would supply a large trough can be fitted with numerous faucets from which many drivers can fill pails and water their horses at the same time. Besides, as suggested at the meeting of the Keystone Veterinary Medical Association in Philadelphia in May, the same pails can be used for "sousing" the horses in warm weather. The president of the Pennsylvania Society for the Prevention of Cruelty to Animals, who was present, expressed his approval and intimated that his society would be glad to furnish new pails to at least some of those who might not have them. And so it would seem that there will be no serious difficulty in establishing this new method of supplying fresh, clean water to the horses of those of our big cities who have not already adopted it, and its advantages from a sanitary viewpoint are obvious, and need no argument. Whenever that has been accomplished it means that a great source of contagion has been eliminated; but it must become *general* to be effective, and we shall therefore hope for its accomplishment in the shortest possible time in every city in our land. We trust, therefore, that veterinarians everywhere will see it as their duty to work this reform in their own cities. They will not find it difficulty to get the people with them if they take steps to convince them of the danger their animals are exposed to through this medium. Sanitarians have long since recognized the danger of the public drinking cup for human beings, and how much more patent is the danger in the public watering trough for horses, when we consider the different method of drinking in the case of the horse as compared with man. Call the horse owners of your communities together and address them publicly on this very important sanitary question. The veterinarians of a community,

flanked by one or two broad-minded, public-spirited physicians, can clearly demonstrate to the public the danger of the present system. We intended to discuss other phases of the glanders question, but will take up another phase next month, and conclude by requesting veterinarians throughout the country to let us know their attitude on the public watering trough, and what system of street watering of horses prevails in their respective communities.

BON VOYAGE.

There is only time to say the last word to our friends who will sail from New York Harbor June 13th on the steamship Finland of the Red Star Line, beginning their trip on the *Official Tour of Europe* under the direction of Dr. Eichhorn. To those in New York and vicinity, it will be a pleasant thing to go down to the pier and see their friends off. At the time of this writing the following had been booked for the trip: Dr. Adolph Eichhorn, Washington, D. C.; Dr. C. J. Marshall and Mrs. Marshall, Philadelphia; Dr. E. H. Shepard, Cleveland, Ohio; Dr. F. B. Hadley, Madison, Wisconsin; Dr. F. B. Harries, Calgary, Alberta, Canada; Dr. L. Enos Day and Mrs. Day, Chicago, Ill.; Dr. T. Lambrechts, Montevideo, Minnesota; Dr. W. Reid Blair and Mrs. Blair, New York, N. Y.; Dr. W. B. Holmes, Springfield, Illinois; Dr. J. M. Armstrong, East Providence, R. I.; Dr. S. Stewart and Mrs. Stewart, Kansas City, Mo.; Mr. H. C. Moore and Mrs. Moore, Indianapolis, Ind.; and Mr. Joseph K. Kerrick, Philadelphia, Pa. But it is altogether likely that several more will book before the time of sailing, as we know of some that have been endeavoring to get matters settled with that end in view that have not yet been able to do so. The Red Star Line dock is at Pier 59, North River, and the exact time of sailing may be obtained by communicating with the general office, No. 9 Broadway; telephone 2100 Rector. We would like to see a large delegation at the pier to wish our brothers and sisters *bon voyage*,

and know it will be appreciated by them. For those throughout the country who cannot get to the pier, the REVIEW says for them, *bon voyage*.

OFFICIAL STEAMER TO THE CONGRESS.

For those who will attend the Congress in London, August 3d to 8th, but who cannot arrange to avail themselves of the official tour, the Bureau of University Travel have a nice arrangement to offer, whereby all those going to the Congress from this side may have the pleasure of crossing the Atlantic together, thus greatly enhancing the pleasure of the trip. They have chosen the steamship Minneapolis of the Atlantic Transport Line, sailing from New York July 25th. Minimum rate, first cabin, $85; 25 per cent. discount on all rates above the minimum. All going on either this steamer direct to London or the earlier one will be able to secure accommodations at the Hotel St. Ermins, as stated in the May REVIEW, by communicating with the Bureau of University Travel, 31 Trinity Place, Boston, Mass. The rate at the St. Ermins is 14 shillings ($3.50) a day, American plan.

THE HEARINGS ON THE LOBECK BILL.

As announced on page 146 of the May REVIEW, the hearings on the Lobeck Bill came before the Committee on Agriculture in the House of Representatives on April 20, 1914, and we have since received a copy of the hearings and read the addresses we stated were to be given at that time. We now urge, at the suggestion of National Secretary Walkley, that all veterinarians and veterinary students write to their respective Congressmen for a copy of the "Hearings," and urge the Congressman to use his influence to have the House Committee report favorably on H. R. 9292 at an early date. The doctor also requests that any one receiving lukewarm replies to their requests from their

Representatives forward the letter to him (Dr. S. J. Walkley), Congress Hall Hotel, Washington, D. C., that he may endeavor to learn the cause of the lack of interest, and endeavor to overcome it. The cause is a good one, lend it your earnest support until it becomes an accomplishment.

Dr. D. Arthur Hughes Goes to Fort Worth, Texas. —Our esteemed collaborator, Dr. D. Arthur Hughes, received telegraphic instructions on May 2 to proceed immediately to Forth Worth for temporary duty as veterinary inspector of meats in the Office of the Depot Quartermaster, Major Alexander M. Davis, of the Quartermaster Corps of the Army. Dr. Hughes' order reads that he is to return to Chicago at the expiration of his duty in Fort Worth.

The opening of a depot at this point is a new army move incident to the Mexican crisis, the object being to purchase subsistence supplies in enormous quantities at Fort Worth, especially fresh beef, for the field armies in eastern and northern Mexico in case of war, and for the militia and volunteer forces which will be probably mobilized in Texas at some points, possibly at Fort Worth, Dallas, Houston, San Antonio or nearer the border. If hostilities break out it is expected that Fort Worth will be the big meat supply depot, as it is the largest packing house centre nearest the border, and it is of the highest importance that that depot be established and thoroughly organized early. Consequently that office is engaged in gathering data on available stock for immediate use, the maximum capacity of business houses there and in neighboring cities to meet the expected draft on them for subsistence supplies. Preparation is being made for possible exigencies so that the Quartermaster Corps may be ready to furnish supplies in enormous quantities and with the utmost speed in case of active warfare with Mexico. The army wants no repetition of that unpreparedness and the terrible losses which occurred at Chickamauga Park and elsewhere during the Spanish-American War.

Dr. and Mrs. A. T. Ayres, Oklahoma City, announce the birth of "Georgie," May 18, 1914, weight 7½ pounds. Georgie is welcomed into our circle of friends, and her parents are tendered the congratulations of the profession through the Review.

ORIGINAL ARTICLES.

THE PRODUCTION OF ARTIFICIAL IMMUNITY AGAINST TUBERCULOSIS IN DOMESTIC ANIMALS.*

By S. H. Gilliland, V.M.D., M.D., Former State Veterinarian of Pennsylvania, Late Director Pennsylvania State Department of Health Laboratories, Marietta, Pa.

The experiments we are about to report extend over a period from 1900 to the present time. More than four hundred cattle (cows, yearlings and calves), hogs, rabbits and guinea pigs were used to obtain the information here presented.

We believe a concise résumé of these experiments of the State Livestock Sanitary Board of Pennsylvania will be more interesting and instructive than an attempt to review the voluminous work others have done on this subject and thereby attempt to draw comparisons. This will be done in the complete publication of the work in the bulletin form. However, mention might be made of some of the early work done along this line. In 1889 Samuel G. Dixon published in the *Medical News,* October 19, p. 435, "Possibility of Establishing Tolerance for the Tubercle Bacillus," in which he obtained a resistance against tuberculosis in rabbits by the injection of involuted forms of tubercle bacilli. In 1892 and 1893 Trudeau found that by subcutaneous inoculation of living cultures of avian tubercle bacilli he was able to increase the resistance of a rabbit to infection of living virulent mammalian cultures. He also succeeded in immunizing rabbits to such an extent that when inoculated in the eye with mammalian cultures the first inflammatory reaction gradually disappeared, leaving the eye in a normal condition, while similar inoculations in control animals led to the destruction of the eye. In 1894 E. A. de Schweinitz, of the United States Bureau of

* Read before the Pennsylvania State Veterinary Medical Association, Philadelphia, March, 1914.

From the Laboratory of the State Livestock Sanitary Board of Pennsylvania.

Animal Industry, reported in the *Medical News* some experiments made upon guinea pigs in which these animals were inoculated with tubercle bacilli of the human type cultivated upon glycerine beef broth for about twenty generations. These animals with controls were afterwards injected with tuberculous material from a cow. The treated guinea pigs remained free from tuberculosis, while the check animals inoculated with the same tuberculous material from the cow died of tuberculosis within seven weeks.

In September, 1910, Schroeder & Mohler, of the United States Bureau of Animal Industry published a report upon the Immunization of Cattle against Tuberculosis, giving the results obtained by them with the Von Behring method, the Heyman method and the Pearson method. The latter is the one suggested by the late Dr. Leonard Pearson in connection with the experiments that are here reported. They found in a comparison of the methods that 88 8/10 per cent. of the animals immunized by the Pearson method were successfully protected for approximately two years, while only 66 2/3 per cent. were successfully protected by the Von Behring method. The Heyman and the subcutaneous methods, according to their experiments, gave a much lower percentage of animals successfully protected. Von Behring announced December 12, 1901, that he was engaged in studying the immunization of cattle against tuberculosis, and detailed experiments upon several cattle treated with injections of tuberculin and cultures of tubercle bacilli of varying degrees of virulence and from several sources, and afterwards inoculating the animals with tuberculous material or cultures of proven virulence. All of the protected cattle except one were still living when this announcement was made.

Systematic efforts to immunize against tuberculosis may be said to have commenced earnestly with the discovery of tuberculin by Koch in 1890. Since this date there have been many investigators throughout the world who have reported the results of their researches in the production of immunity in tuber-

culosis, and regret that time does not permit the presentation to you of abstracts of the results of these patient investigators.

In 1902 Pearson & Gilliland* published accounts of some experiments made by them upon the immunization of cattle against tuberculosis by the use of culture of living tubercle bacilli of the human type.

It might be well at this point to describe the culture used to produce the immunity, as it was used in many of the later experiments. It is known throughout all the experiments as Culture M, and was obtained from the sputum of a young adult that had a constant cough, though no involvement of the lungs could be detected on physical examination. Smears made for microscopic examination from the specimen of sputum showed an extraordinarily large number of tubercle bacilli. The organism was obtained in pure cultures on dogs' blood serum by the passage through guinea pigs on October 15, 1899. Microscopic examination of the bacilli revealed them to be irregular in size and shape. Many were curved and some S shaped. Beading not marked; stain deeply and fairly evenly. This culture at the time it was isolated and for some years afterwards, was found to be virulent for guinea pigs in ordinary doses, but not virulent for rabbits, goats or calves.

Preparation of the Vaccine.—The method of preparation of the vaccine used throughout all the experiments was practically the same except where otherwise noted. A quantity of tubercle bacilli from a three to four-week old glycerine bouillon culture was taken, the excess of moisture removed by either blotting between layers of sterile filter paper or drying over calcium chloride in a dessicator for a short time and then rubbed in a mortar or ground in a flask with bronze balls. No effort was made to get the bacilli perfectly dry owing to the danger to the operator in grinding them and making the suspension. It was not the object to break up the bodies of the bacilli, but to separate them so that a homogenous suspension could be obtained. During the process of rubbing or grinding small quantities of

* Philadelphia Medical Journal, Nov. 29, 1902.

normal saline solution were added from time to time. The suspension was allowed to stand in a cylindrical receptacle until all clumps of bacilli had settled to the bottom, and then the supernatant, homogeneous suspension of tubercle bacilli was decanted off. This suspension was further diluted with normal saline solution until its opacity was equal to a 24-hour old bouillon culture of typhoid bacilli. This method of measuring the dose suggested itself from the work of other investigators. For a comparison with the work of others the amount by weight of dried bacilli per cc. of standard suspension was determined. This was done by taking a large quantity of killed tubercle bacilli and dessicating over calcium chloride until perfectly dry. These were then rubbed in a mortar and suspended in normal salt solution until the opacity was the same as the standard vaccine. By this method it was determined that 1 cc. of the standard suspension of vaccine contained the equivalent of 0.0013 gram (1.3 milligrams) of tubercle bacilli. This equivalent was determined with a very large quantity of dried tubercle bacilli, and the fraction of error for 1 cc. was infinitesimal.

In some of the later experiments the vaccine was prepared by weighing the bacilli after the excess of moisture had been removed by dessication. These suspensions were prepared so that one cc. represented 1 milligram (0.001 gram) of dried tubercle bacilli. This was believed to be more accurate than the opacity method.

The vaccine was generally injected within a few hours, or at the most within a few days from the time it was prepared. It was found that some lots of vaccine had a tendency to clump if allowed to stand for any length of time. If the vaccine was not used within a few hours after its preparation it was kept in an ice chest and microscope and cultural examinations made to determine its sterility.

Method of Vaccination.—In all cases except where otherwise noted the vaccine was injected into the jugular vein. The animal was either confined in a stanchion or cast, depending upon its size. The hair over the jugular vein was clipped with

scissors and afterwards the skin was washed with a solution of carbolic acid or creolin. The jugular vein was filled by compressing the thumb at the lower portion of the neck. The needle was then inserted into the vein and a few drops of blood were allowed to pass through the needle to insure the same being open. The syringe was then attached to the needle and the required dose injected directly into the blood stream. A syringe with a slip needle is best adapted for this work.

The first experiment was started November 19, 1900, with the object in view of determining whether calves can be infected, to what extent and in what time, by large and repeated injections of tubercle bacilli of the human type. This experiment led us to believe that cattle were refractory to enormous quantities of tubercle bacilli from certain human sources, and further, that such injections were capable of greatly increasing the normal resistance of cattle to virulent tubercle bacilli of bovine origin.

About the same time another experiment was carried out in which four yearling calves were used, two of which received seven vaccinations between March 24th and June 2d. The other two animals were kept as controls. Approximately eight weeks following the date of the last vaccination of the two animals, they were injected intratracheally along with their controls with 10 cc. of a standard suspension of a bovine culture of tubercle bacilli known to be highly virulent for cattle. The four animals were killed about three months from the date of intratracheal infection. Two vaccinated animals contained no distinct lesions of tuberculosis, while the two controls contained widely distributed active progressive lesions. The detailed results of these two experiments were published by the late Dr. Leonard Pearson and the writer in the *Journal of Comparative Medicine and Veterinary Archives* of November, 1902, and at that time we concluded:

1. That after repeated intravenous injections of cultures of tubercle bacilli from human sputum the resistance of young cattle to virulent tubercle bacilli of bovine origin may be in-

creased to such an extent that they are not injured by inoculation with quantities of such cultures that are capable of causing death or extensive infection of cattle not similarly protected.

2. That by intravenous injection much larger quantities of culture of human sputum tubercle bacilli than are necessary to confer a high degree of resistance, or immunity, upon the vaccinated animal may be administered without danger to that animal.

Since that time the question immunization of cattle against tuberculosis has been a constant study at the laboratory and experimental farm of the State Livestock Sanitary Board. The following experiments give the results of the work having a direct bearing upon the application of a practical method of immunizing animals against tuberculosis. There were other experiments conducted to obtain knowledge of the virulence of cultures, the best method of administering the vaccine, etc., that are not here recorded.

Experiment 115A.

This experiment was started in November, 1902, with the object of further determining the immunizing value of intravenous injections of cultures of tubercle bacilli of human origin, and also to ascertain the dosage and the method best adapted to achieve this purpose.

There were fourteen yearling heifers and steers in this experiment, nine of which were vaccinated by various methods and five were kept as controls. All of the animals were determined to be free from tuberculosis by the application of the tuberculin test. Animals No. 45183, a brindle steer, and No. 45184, a black heifer, were given ten intravenous vaccinations between November 27, 1902, and March 2, 1903. The amount of vaccine administered at each vaccination ranged from 10 cc. to 30 cc. of a standard suspension of culture M. The interval between vaccinations varying from 8 to 14 days.

Following the vaccination of the black heifer, No. 45184, on January 10th, she was noticed to be much depressed, the respirations were greatly increased, labored and painful.

These animals were kept during the period of vaccination in a temporary stable in connection with the Veterinary Hospital of the University of Pennsylvania.

On June 16, 1902, 3½ months after the last vaccination, they were placed with their controls in a pasture with a number of tubercular cows. They were removed from this pasture five months later and stabled with cows with advanced tuberculosis until killed.

The brindle steer, No. 45183, was killed September 7, 1904, one and one-half years from the time the last vaccine was administered. On post-mortem examination this animal showed general progressive tuberculosis of the pleura, lungs, mediastinal and bronchial lymphatic glands, omentum, peritoneum, liver, spleen, as well as the post-pharyngeal and mesenteric Lymphatic glands. A striking feature in this case was the uniform distribution of the tubercular areas in the lungs. Evidently the tubercle bacilli were carried there by the circulation.

The black heifer, No. 45184, which received the same treatment as the brindle steer, No. 45183, was killed at the same time and a very careful examination of all the organs, glands and membranes failed to detect any evidence of tuberculosis except in the posterior mediastinal lymph gland, which contained three caseous, well encapsulated tubercles the size of a pea. The tuberculin test of this animal prior to entering the experiment shows that she had an after temperature of 103.2 F. though she was considered at the time to be free from tuberculosis.

It is the belief of the writer that the brindle steer, No. 45183, had a low natural resistance and became infected from the too frequent and too large doses of vaccine. This conclusion is based upon the character and distribution of the lesions in the lungs and other organs. The pathologic picture was one of a mild progressive generalized tuberculosis.

In the case of the black heifer, No. 45184, she either contained a small lesion of tuberculosis before entering the experiment or else the immunity conferred by the vaccine was lost before she was killed, one and one-half years following the last

vaccination. Inoculations of guinea pigs from the lesion found in the mediastinal gland of this animal, proved that the bacilli had a much greater degree of virulence than the Culture used for the preparation of the vaccine.

Two more animals, a spotted bull, No. 45185, and a brown and white heifer, No. 16025, were vaccinated three times with a standard suspension of tubercle bacilli, twice with culture M and once with culture U, as follows:

Bull No. 45185.

Nov. 27 Vaccinated in Jugular Vein 10 c.c. Standard Suspension Culture M.
Dec. 23 Vaccinated in Jugular Vein 20 c.c. Standard Suspension Culture M.
1903
Jan. 24 Vaccinated in Jugular Vein 5 c.c. Standard Suspension Culture U.

Heifer No. 16025.

1903
Jan. 31 Vaccinated in Jugular Vein 10 c.c. Standard Suspension Culture M.
Mar. 21 Vaccinated in Jugular Vein 20 c.c. Standard Suspension Culture M.
Apr. 10 Vaccinated in Jugular Vein 5 c.c. Standard Suspension Culture U.

It will be noticed that the vaccine for the last vaccination of these animals was prepared from culture U. This culture was isolated by Dr. M. P. Ravenel from the mesenteric gland of a child in December, 1901. It was found to be highly virulent for guinea pigs, and a six weeks' old calf inoculated intravenously with it on March 4, 1902, was killed in a moribund condition six weeks later and showed extensive tuberculosis of the lungs, some of the nodules having gone on to the caseation stage. The lymph glands were enlarged and microscopic scrapings from the same revealed enormous numbers of tubercle bacilli. This culture was used for the third vaccination with the idea that the first two vaccinations with culture M would give sufficient immunity to protect against infection from culture U and a higher resulting immunity would thereby be obtained.

These animals were exposed to natural infection by association with tubercular cows in the same manner as the controls. The exposure with tubercular cows started on June 16, 1903.

The spotted bull, No. 45185, died of tympanites on September 4, 1904, one year and eight and one-half months following

the last vaccination. On autopsy the mediastinal lymphatic glands were enlarged and contained caseous material, surrounded by a thick fibrous wall. The posterior mediastinal gland was 4 inches by 6 inches, which forced the oesophagus downward and may explain the tympanites.

The brown and white heifer was killed September 7, 1904, one year and five months following the last vaccination. Autopsy revealed two questionable lesions in the left lung. Three caseo-calcareous nodules in mediastinal lymph glands. Three caseous areas ⅛ inch to ⅓ inch found in mesenteric lymph glands. Post-pharyngeal lymphatic glands enlarged and caseous.

The lesions in both of these animals were well circumscribed and walled off by fibrous tissue. From this and later knowledge obtained it seems more probable to the writer that the vaccination with culture U following so close upon the previous vaccination with culture M was the cause of infection rather than from the association with the tubercular cows.

The fifth vaccinated animal of this experiment received on November 27, 1902, a single vaccination of 10 cc. of culture M. On January 20, 1903, this animal died of intestinal trouble and must be excluded from the experiment.

The sixth and seventh vaccinated animals, a red bull, No. 45191, and a red steer, No. 45192, received between November 27, 1902, and January 24, 1903, three intravenous injections of culture M and two intravenous vaccinations of culture U, as follows:

1902
Nov. 27 Vaccinated in Jugular Vein 10 c.c. Standard Suspension M.
Dec. 4 Vaccinated in Jugular Vein 15 c.c. Standard Suspension M.
Dec. 15 Vaccinated in Jugular Vein 20 c.c. Standard Suspension M.

1903
Jan. 10 Vaccinated in Jugular Vein 5 c.c. Standard Suspension U.
Jan. 24 Vaccinated in Jugular Vein 5 c.c. Standard Suspension U.

These animals were exposed to natural infection by association with tubercular cows in the same manner as the other animals of this experiment.

The red bull, No. 45191, was killed April 30, 1904, one year and three months following the last vaccination. A careful

autopsy failed to reveal any lesion of tuberculosis. All organs, glands, etc., normal.

The red steer, No. 45192, was killed April 26, 1904, one year and three months following the last vaccination. Both front knees of this animal had been greatly enlarged for three months and extremely painful. The capsules were enlarged and filled with a pink gelatinous material. Between the two rows of carpal bones the cartilages were eroded. On further autopsy there was found to be a moderate number of tuberculous deposits in the lungs about 1/8 to 1/4 inch in diameter. The bronchial and mediastinal lymphatic glands were enlarged and contained dense calcareous deposits. The viscera, pleura, diaphragm and peritoneum contain a few reddish growths. Microscopic examination of these deposits and growths shows no tubercle bacilli. However, animals inoculated from the lesions developed tuberculosis. A most striking feature was the sharpness with which the diseased areas were marked off from the normal tissue.

The eighth vaccinated animal, a red bull calf, No. 16066, received five intravenous vaccinations of culture M between May 16 and August 5, 1903, the dose gradually increasing from 1 cc. on the first injection to 10 cc. on the last injection.

On July 9, 1903, it was exposed to natural infection of the same degree as the other animals of the experiment.

It was killed on September 7, 1904, after 14 months of exposure to natural infection. A careful post-mortem examination revealed no evidence of tuberculosis except a calcified nodule 1/3 inch in diameter in posterior lobe of left lung. Guinea pigs inoculated from this lesion developed tuberculosis in six weeks.

The ninth and last vaccinated animal of this experiment, red steer No. 20027, received five intravenous vaccinations of culture U between December 1, 1903, and July 14, 1904. The dose was 10 cc. at each vaccination except the fourth, at which time it was increased to 15 cc.

On July 5, 1904, previous to the last vaccination, this animal was removed from the temporary barn in Philadelphia to the Experimental Farm in Delaware County and exposed to natural

infection by association with tubercular cows. This animal steadily gained in weight and remained in good condition. It was killed on December 30, 1905, one year and a half of constant exposure to infection. A very careful examination of all the organs, glands and membranes failed to show any evidence of tuberculosis except in left post-pharyngeal gland there was a cheesy focus one inch in diameter. The lesion did not have the appearance of an active one.

The five control animals for this experiment, red steer No. 45186; black bull, No. 45188; black and brown heifer, No. 45168; red bull, No. 45189; and red heifer, No. 45190, were kept under the same conditions as the vaccinated animals and exposed with them to the same degree of natural infection.

Post mortem of controls as follows:

Animal No. 45186. Killed April 30, 1904—

Tuberculosis of lungs, t t. Pleura, t t. Post-pharyngeal glands, t t. Bronchial glands, t t. Mediastinal glands, t t t. Pericardium, t t t. All the lesions appear to be active and progressive.

Animal No. 45188. Killed September 7, 1904—

Active tuberculosis found in left lung, t t. Bronchial glands, t t t. Mediastinal glands, t t t.

Animal No. 45168. Killed September 7, 1904—

Tubercular lesions found lungs, t t. Bronchial glands, t t t t. Mediastinal glands, t t t t.

Animal No. 45189. Killed April 30, 1904—

Lesions of tuberculosis in lungs, t t t t t. Pleura, t t. Pericardium, t t. Cervical lymphatic glands, t t. Bronchial glands, t t t t. Mediastinal glands, t t t t t. Lymphatic glands anterior to heart and below trachea, t t. Liver, t t. Portal lymphatic gland, t t. Omentum, t t. Diaphragm, t t. In this animal the disease is rather widely distributed and of an active character.

Animal No. 45190. Killed September 7, 1904—

Lesions of tuberculosis found in lungs, t t t. Bronchial glands, t t t. Mediastinal glands, t t t t. Liver, t t t t. Diaphragm, t. Mesenteric glands, t t.

NOTE.—The extent of the disease is indicated by t signs. One t sign means very slightly involved, while six t t t t t t signs means extensive involvement of the organ, gland or tissue named.

EXPERIMENT 115D.

This experiment was started with the object of determining the size of the dose, the number of doses and the best interval between the injections of tuberculosis vaccine to produce a serviceable degree of immunity in calves against the disease by natural infection. Thirty calves, ranging in age from 10 to 12 weeks, were selected for this purpose; twenty to be vaccinated, and ten to be used as controls. These animals were purchased in Somerset County and were received in Philadelphia during a warm spell of weather in July, 1903. They were given a tuberculin test, which was only partially satisfactory, owing to the age and condition of the animals. However, they were selected from apparently healthy herds.

These calves were placed on a pasture in Montgomery County, where they contracted lung worms (Strongylus Micrurus) during the period of vaccination, and twelve of the thirty died, leaving twelve upon which vaccinations had been started, and six controls. The animals to be vaccinated were divided into four lots.

Lot I—

Roan heifer, No. 16081; red and white heifer, No. 16087; and fawn heifer, No. 20002, were given four intravenous vaccinations of a standard suspension of culture M between August 5, 1903, and January 6, 1904, the dosage increasing from 5 cc. to 15 cc.

Lot II—

Consisted of two animals: White heifer No. 16089; and brown and black bull, No. 16092. They received, between August 5, 1905, and January 6, 1904, five vaccinations of a standard suspension of culture M, the dosage increasing from 4 cc. to 18 cc.

Lot III—

Consisted of three animals: Red steer, No. 16080; brindle bull, No. 16093; and red bull, No. 20005. They were given in all five vaccinations of a standard suspension of culture M. The

dosage was somewhat larger than for Lot II, the first dose being 5 cc. and the last dose 20 cc.

Lot IV—

Consisted of four animals: Red bull, No. 16079; red heifer, No. 16084; brown and black heifer, No. 16095; and spotted bull, No. 16091. These animals received in all six vaccinations—five of a standard suspension of culture M and one of a standard suspension of culture U—between August 5, 1903, and March 18, 1904. The dosage was 5 cc., 10 cc., 15 cc., 15 cc., 20 cc. and 10 cc.

The animals of these four lots with their controls were exposed during the period of vaccination to a moderate degree of infection by association in a pasture with tuberculous cows. Following the vaccinations they were all constantly exposed to infection by being stabled with cows with generalized tuberculosis.

Results of Autopsies—Lot I—

Animal No. 16081. Killed December 30, 1904. All organs normal.

Animal No. 16087. Killed April 8, 1905. All organs normal, except pea sized, well encapsulated nodule in left post pharyngeal gland, with all the appearances of an inactive lesion.

Animal No. 20002. Killed April 8, 1905. No evidences of tuberculosis could be found.

Lot II—

Animal No. 16089. Killed December 30, 1904. No tuberculosis.

Animal No. 16092. Killed April 8, 1905. No tuberculosis.

Lot III—

Animal No. 16080. Killed September 15, 1904. No tuberculosis.

Animal No. 16093. Killed December 30, 1904. No tuberculosis.

Animal No. 20005. Killed April 8, 1905. No evidences of tuberculosis found except in left pharyngeal gland there is a small nodule 1/8 inch in diameter surrounded by a gray capsule. Guinea pigs inoculated from this nodule developed tuberculosis.

Lot IV—

Animal No. 16079. Killed September 15, 1904. No tuberculosis. Small sections in the lungs show chronic bronchial pneumonia.

Animal No. 16084. Killed December 30, 1904. No tuberculosis. A small greenish nodule found in one of the lungs. Upon histological examination it resembled a dense collection of lymphoid tissue rather than a tubercular process.

Animal No. 16095. Killed April 8, 1905. No tuberculosis.

Animal No. 16091. Killed April 8, 1905. No tuberculosis.

Controls—

Animal No. 16082. Killed September 17, 1904. Early active lesions of tuberculosis were found in the lungs, t t. Post-pharyngeal glands, t t. Mesenteric glands, t t t.

Animal No. 20007. Killed December 30, 1904. Active tuberculosis of lungs, t t t. Bronchial glands, t t t t. Mediastinal glands, t t t. Liver, t.

Animal No. 20008. Killed December 30, 1904. The lungs contain one small area of suspected tuberculosis which was not proven by animal inoculation. Tuberculosis found in the bronchial glands, t t; and mediastinal glands, t t t.

Animal No. 16086. Killed April 8, 1905. Tuberculosis of the post-pharyngeal glands, t t t; and Omentum. Lungs normal.

Animal No. 20003. Killed April 8, 1905. Active tuberculous processes found in the post-pharyngeal glands, t t t; and mediastinal glands. No tuberculosis of lungs.

Animal No. 16090. Died February 11, 1905. Was in very poor condition for two months. Extensive generalized tuberculosis of lungs, t t t t t t. Bronchial glands, t t t t. Mediastinal, t t t t. Pericardium, t t. Pleura, t t t t t. Diaphragm, t t t. Post-pharyngeal glands, t t t. Portal lymphatic gland, t t. Omentum, t t t.

The average length of exposure to infection for the vaccinated animals was 1 year, 172 days; while for the controls it was 1 year, 166 days. In brief, we find only two of the 12 vaccinated animals showed any evidence of tuberculosis, and in

those the lesions were very small and inactive, while all the controls presented lesions of tuberculosis distributed throughout the body. One of the controls developed tuberculosis to such an extent that it died in 1 year and 190 days, showing that the degree of exposure to infection was severe.

REFERENCES.

To Dr. Leonard Pearson much credit is due for the original plans of these experiments, and only through his untiring efforts were means obtained from the Legislature by which it was possible to pursue this important line of investigation. Difficulties arose in the progress of this work that seemed insurmountable, and through the wise counsel, kindly suggestions, and encouraging words of this one man the parties in direct charge of the work were stimulated to exert their best efforts.

The writer is deeply conscious of the fact that these experiments could have been presented in a more concise, a more intelligent and a more able manner by the one whose untimely death was a severe blow to the entire veterinary profession. These investigations were originally planned and started by Dr. Leonard Pearson and the writer, who later secured the assistance of a number of men, and to these men I desire to express my thanks:

To Dr. M. P. Ravenel for the isolation of most of the cultures used in the preparation of the vaccine.

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To Dr. E. S. Deubler and Dr. John Reichel for the preparation of the vaccine for the latter experiments and general bacteriological work.

To Dr. E. S. Deubler credit is due for many of the autopsies, the vaccinations of the animals and the supervision and management of the Experimental Farm following 1907.

For general assistance during various phases of this work we are indebted to Dr. H. C. Campbell, Dr. E. P. Althouse, Dr. E. Barnett and Dr. I. B. Powell.

(*To be concluded in next issue.*)

ALUMNI DINNER AT NEW YORK ATHLETIC CLUB JUNE 10, 1914.—The pleasant memory that lingers with those alumni of New York University who attended the dinner of the New York American Veterinary College at the New York Athletic Club a year ago will make them very receptive to the announcement that again this year they are to dine amid the surroundings that so delighted the artistic temperament of our good friend Howard from Boston, as to make it impossible for him to restrain the flow of poetic sentiments that characterized his after-dinner remarks. And while the symptoms were not so *speakingly* pronounced with everyone present, all were similarly affected, and, we trust, have told their brother alumni about it, so that the numbers will be even greater on this second occasion. The veterinary alumni association meeting, as announced in the MAY REVIEW will be held in the middle of the day at the old veterinary building at 141 West 54th street, so that the members may attend the commencement exercises at University Heights in the afternoon. The excellent music and splendid addresses are features that stand out prominently at this annual function.

THE TISSUE FOOD.*

By John A. McLaughlin, D.V.S., New York, N. Y.

When I read my last paper, "*The Tissue Medium*," I earnestly requested a full discussion and criticism of the thought I had advanced. I wished to hear from my fellow practitioners its strength or its weakness. Evidently I did not make my view-point clear, for what I desired most to hear discussed has been passed by in silence. I accept all blame for this, but in excuse will say that I had to crowd a vast deal in one small paper.

I was, and am, attempting to study physiology in the light of anatomy, and anatomy, that is structural anatomy, in the light of physiology. Knowing the end product of food, that is its physiological ending, also its anatomical ending, knowing its source as well as its destination, I attempted to study the structural anatomy of the parts involved by following it from its source to its destination. One of my critics insists that any theory to be of value must present original facts, replying to which I will state that I accept the facts presented in any text-book on anatomy or physiology. If I am in error in one essential fact, then is my theory wrong.

The following may present my view-point more clearly: If the different parts of a machine were found separated, and their purpose unknown, both its construction and its purpose would be disclosed as soon as it performed a recognized feat. If the separated parts were those of a flying machine, it would be impossible to tell it was a flying machine (without previous knowledge) until the parts were put together correctly, nor would it be known that the parts were put together correctly until it flew, when both its purpose and its correct structure would be known. When we see a printed paper passing from a multiple press, we are assured that the parts of that machine are put to-

* Presented at the February meeting of the Veterinary Medical Association of New York City.

gether correctly, but with the same assurance we can affirm that the parts are put together on correct mechanical principles. To think otherwise would be absurd.

So I was, and am, attempting the study of the organism, or rather a part of the organism, its anatomy and physiology as we would a man-made machine. To do this effectively, I sought a substance that was possessed of physical properties whose upbuild or synthesis could be followed from start to finish, just as we might follow a product of some man-made device, from the raw material to the finished article. The tissue medium I considered was such a substance; it is an end product (by an end product I mean the last of more than one product in which the intermediate products are but stepping stones to the finished article). (2) We know from whence it comes and to where it goes and the purpose it is intended to serve. (3) It comes from the food the organism partakes of and is intended as food for the tissues and its destination must be the tissues. (4) We know the structural anatomy and histology of the parts, and as sure as the multiple press is built on recognized mechanical principles so must the organism (and the parts which produce the tissue medium) be constructed on the same mechanical principles.

In one respect, however, you have accorded me enlightenment. I was not as clear as I should have been on the subject of plasma; when I said if the tissue medium was not the plasma itself it existed in the substance of plasma, I was, I admit, rather vague, for I had been speaking of both as identical substances. That I might be more clear in this paper, I have entitled it *The Tissue Food,* between which and the tissue medium and the plasma there *is* a difference. On the term plasma I have been a little hazy also. I have used it to indicate the tissue medium—that fluid which bathes the tissues; our text-books term it lymph; I think both terms could be substituted by a better one, for plasma implies that it is found only in the blood, lymph that it is found only in the lymphatic vessels; I propose to name it *tissue plasma.*

By *tissue food* I mean the substance, simple or compound, by which the tissues actually live, by the tissue medium I mean the

fluid they live *in*. They live *by* tissue food, they live *in* tissue plasma; tissue plasma is their material world as the outside material world is that of the organism; it is tissue food I am studying, not plasma, and it is the anatomical construction of the parts which produce and transport it to its destination I am attempting to interpret, and which when interpreted correctly will be found, must be found, to be constructed in accord with mechanical principles.

In my last paper I studied the route of the tissue food or, as I then termed it, the tissue medium (plasma) from its source to its destination, and described the structural arrangement of the parts in which it was produced and transported from its source to the tissues. That description disclosed a route that was constructed (or, I contended, was constructed) on approved mechanical principles. In this paper I propose to study the *tissue food*, by reversing the order I then followed and beginning at the tissues, retrace its course to its source.

The first step backward brings us into the circulatory apparatus. The circulatory apparatus and the tissues are anatomically distinct, so this first step backward actually transports us from one part of the organism to another, a most remarkable feat of transportation. This remarkable feat is accomplished by passing directly *through the walls of the capillaries*. It is essential to my purpose to discover the import of this physiological phenomenon. What we must decide is whether it is an incidental occurrence, as absorption, or whether it is a *genuine* physiological function.

As I contend that all physiological phenomena must have an anatomical explanation or a histological one, it is essential to my theory that this particular phenomenon must have an explanation in the histology of the capillaries, and I consider the assumption well founded that the capillaries are histologically, physiologically and regionally adapted to perform the work they do, and their function is the result of a special design on the part of the organism. Nor is this function a simple one, but holds a very important place in physiology; for this act of passing through the capillaries is not merely one of passage, but one of filtering, and the

filtering is as important a physiological function as is the act of transportation. Transportation is essential, for if the tissue food should remain in the circulatory apparatus, it could not be of any benefit to the tissues, but filtering is also essential to prevent substances that are inimical to the tissues coming in contact with them. To sum up the functions of the capillaries, they filter the good from the bad, permitting the good to pass their walls, retaining the bad within their walls. Now we know what passes through and we know just what remains in the capillaries, plasma passes through, corpuscles remain in the circulatory apparatus. I infer from this that plasma represents the good and the corpuscles represent the bad. I infer also that the tissue food exists in the plasma and not in the corpuscles.

With these remarks regarding the physiology of the capillaries, we can continue retracing the route of the tissue food with proper intelligence, for knowing that plasma and tissue food are found together, we can disregard the corpuscles even though they dominate the blood so thoroughly and follow the plasma, assured that where plasma is there also is the tissue food.

The second step backward carries us to the lungs. You may ask: Why so far? To which question I must answer that the tissue food is a synthetic product and only cells are capable of a synthetic power, and between the capillaries and the lungs there are no cells. These cells, however, or oxygen, I contended in my last paper had no part in the upbuild of the tissue food. I was very severely criticised for this statement, but my critic was alluding to plasma, which I believe holds oxygen within its substance. This is where, in my previous paper, I made myself ambiguous and used the term plasma and tissue food as meaning the same substance.

It might be well to explain here how oxygen becomes part of plasma. This is my explanation: The corpuscles carry oxygen, in the capillaries they give up this oxygen; the inference is that oxygen enters the plasma in a pure state, but my explanation is that oxidized products when sufficiently prepared for elimination pass through the capillaries to be excreted. In my last paper

I stated that oxygen was essential to elimination, and I might almost add that that constituted its entire function, and only after being thoroughly oxidized can the impurities of the blood be eliminated, but no elimination could possibly take place in the circulatory apparatus, so oxidized substances constituted the oxygen found in the plasma, and also represented its impurities.

From the lungs to the next place where a synthetic process is possible, we must leave the circulatory apparatus entirely. Before leaving, however, I might be asked if the blood has no effect on the tissue food; to which I answer, *no,* the tissue food once formed is altered only by the tissues themselves; when the tissues partake of this prepared diet, the tissue food is changed into tissue substance, tissue by-products and waste.

In the circulatory apparatus there is but one organ that has a direct influence on the tissue food, that is the heart, and the influence of this wonderful organ is confined to transporting it to the tissues. I argue that the tissue food is formed *before* it comes under this influence. The function of the heart is to produce the circulation, without the heart the blood would remain motionless and the tissue food would never reach the tissues; it is the dynamo, the power within the route we are studying. Let us see what this power encompasses.

The heart exists for the benefit of the tissues; every organ exists for the same purpose; it produces the circulation, for otherwise the tissues would starve, the circulation transports the tissue food to the tissues, it is a case where the mountain actually goes to Mahomet, and the heart is the power that moves the mountain, or, if you will, he is the shepherd of his flock of tissues, but instead of leading his flock to the pasture, he sends the pasture to his flock. The organism is capable of movement, and can search for its food, but not so with the tissues, they remain stationary. The relation between the organism and its world and the relation between the tissues and their world (plasma) is reversed, in the former the organism moves; in the latter, the world moves.

According to our text-books the function of the circulation is

to carry, or rather force, oxygen to the tissues. The explanation is that the blood enters the lungs to *absorb* oxygen, and the heart propels this oxygen-charged blood to the tissues, where it is *absorbed* by the tissues. Instead of the blood absorbing oxygen from the atmospheric air, I infer that the lungs are anatomically and histologically designed to secrete oxygen and transport it to the blood vessels which constitute their ducts. It is a parallel function to the lacteals, which secrete tissue food from the food and transport it to their blood *cul-de-sacs* and that of the various glands (the mammary, for instance), which secrete milk from the plasma and transport it to the lacteal ducts. I cannot understand the logic that gives such varied methods of procedure to organs whose difference is only in their structure, but whose purpose is the same, but I can understand the logic that infers that this difference in structure is to meet the difference in environment; nor can I understand the further argument that ascribes absorption to the lacteals, absorption *in* the lungs, absorption to the tissues, secretion to the mammary glands and excretion to the kidneys. It would not be a perfect man-made machine if built in such manner.

Now we will study the route by which the tissue food enters the alimentary lymphatics and leaves the circulatory apparatus (or rather enters it, for we are retracing our course) and the structural arrangement of the parts which connect these two wonderful apparatuses. The connection is made, as we know, by the *thoracic duct* and *the great lymphatic vein,* and there can be no question that these two vessels make a remarkably simple and complete connection. To describe the route, however, from this point onward, or rather backward, I find very difficult; this is because the two ducts or vessels divide into three routes, each route following a different course. The one going to the alimentary canal is undoubtedly the one followed by the tissue food, and as it is our present purpose to study the backward route of the tissue food, this is the one we will follow. Having arrived at the alimentary canal, we will survey the route I have mapped out and then study the structural arrangement of the two apparatuses

and the histology and physiology of the lacteals and the mesenteric veins.

The route is as follows: Beginning in the *lacteals* and passing to the *receptaculum chyli,* from the *receptaculum chyli* to the *thoracic duct,* from the *thoracic duct* to the *circulatory apparatus,* which it enters near the heart, the *right heart,* to be exact, from the *right heart* to the *lungs,* from the *lungs* to the *left heart,* from the *left heart* through *all the arteries, but not into the veins,* from the arteries into the *arterial capillaries, but not into the venous capillaries,* through the walls of the *arterial capillaries* to the *intercellular spaces,* from the *intercellular spaces* into the *open orifices of the* (Note—There seems to be a question of late as to whether the systemic lymphatic vessels are open or closed) *systemic lymphatic vessels.* Now I must pause here for a moment to say that the systemic lymphatic vessels are but the continuation of those of the alimentary lymphatics, that although separated anatomically by the circulatory apparatus they are nevertheless connected physiologically. As we have already noted, the blood has no effect on the tissue food, or upon the substances from which the tissue food is manufactured, so that when these latter substances pass with the tissue plasma into the intercellular paces and from these spaces into the systemic lymphatics the physiological connection is complete. As we have also noted, the systemic lymphatics are divided into two branches, one carrying tissue plasma and tissue food and lymphatic corpuscles (which latter it collects during its progress to the great lymphatic vein) from the right anterior limb, the right moiety of the head and neck and right thorax to the *great lymphatic vein.* During its course it does not meet the alimentary lymphatics, but the other branch, which transports lymph from the rest of the system, meets the alimentary lymphatics at the *receptaculum chyli,* and its contents and that of the alimentary lymphatics pass through the *thoracic duct* as one fluid, and as such empties into the circulatory apparatus. The thoracic duct, however, anastomoses with the great lymphatic vein at their entrance to the veins, which anatomical fact impresses me that the fluids when mixed are performing a physiological feat.

Now to study the structural arrangement connecting the alimentary lymphatics and the alimentary canal. This connection is made, or so I deduce, by the lacteals, and by the lacteals *alone*. In attempting an anatomical explanation of the phenomena of food transportation from the alimentary canal, I wish it to reflect the fact, or what I believe is a fact, that there is no anatomical explanation for absorption by the mesenteric veins.

The great lymphatic system begins in the mucous membrane of the alimentary canal, the circulatory apparatus does not; the import of this fact is that they are connected and the ending of one is the beginning of the other. I say ending advisedly, for the alimentary canal has two endings, one anatomical, the other physiological, the latter ending is the *beginning* of the great lymphatic system. As we have positive proof that the lacteals transport food from the alimentary canal, I assume there is an anatomical explanation for this physiological phenomenon, and the lacteals are constructed, *must* be constructed, to transport the food from the alimentary canal into their blind *cul-de-sacs*. The microscope informs us that the lacteals are supplied with cells, and I ascribe to these cells the power of performing this act. In other words, I contend that the power of transportation is inherent in the lacteals themselves, and not due to the absorption powers of their contents, as happens in the mesenteric veins. It must be remembered that the lacteals are empty when the alimentary canal is empty. There is nothing in their interior to absorb food until the food first gets in them. How does it get in them if not by the power of these cells? We have an explanation of absorption by the mesenteric veins, an incorrect one, I believe, for they are never empty, but to argue absorption for the latter (the veins) is practically to deny it for the former (the lacteals).

I wish to advance the theory that the *great lymphatic system is a gland*, that it begins in the mucous membrane of the alimentary canal and ends in the circulatory apparatus, that its purpose is to manufacture tissue food. It will be seen by this that I consider the anatomical, histological and physiological connection between these two apparatuses is made by the lacteal *cells*. This

connection is analogous, if not identical, with the connection between the glands and the circulatory apparatus. While the activities of one are directed toward the food, the activities of the glands are directed toward the blood, or rather plasma, each lacteal cell producing tissue food and transporting it to its *blind cul-de-sac,* while the glandular cell produces its particular secretion (or excretion) and transports it to its *blind tubule,* the blind *cul-de-sacs* of the lacteals eventually form the thoracic duct, while the blind tubules of the various glands eventually form their ducts. The peculiar construction of the great lymphatic gland can be easily understood from the fact that it must carry nutrition to all parts of the organism, and collect this nutritive material from the alimentary canal. This brings us to a consideration of the anatomical difference between the beginning of this gland and its ending in the circulatory apparatus. In the mucous membrane the *cul-de-sacs* are closed, they end, or rather begin, blindly while the thoracic duct is open. This plan is similar to that of the glands, the ducts of the mammary glands, those of the liver, of the pancreas and kidneys are closed in their beginnings and open at their endings, it would seem that all gland cells have the power of transporting their secretions (or excretions) into blind tubules, and I attribute the same power to the lacteal cells, and as the bladder is the emptying place of the kidneys' excretion, the outer world that of the mammary, the small intestine of bile and pancreatic juice, so the circulatory apparatus is the emptying place of the alimentary lymphatics, and, as I have explained, the emptying place of the systemic lymphatics, which are but branches of the great lymphatic gland. As the bladder empties its contents eventually into the outer world, and the same is true of the bile, pancreatic juice and milk (the latter goes into the infant's mouth) so the contents of the lymphatic gland which finds its way into the circulatory apparatus eventually finds itself fulfilling its function of nourishing the tissues and being eliminated. The inference of our text-books is that there is nothing to be eliminated from the blood but tissue-waste, while I contend that the blood contains many substances, that are very injurious. This I will explain.

If we study the structure of the great lymphatic gland we find the minor lymphatic glands are situated along the course of the vessels, and they receive only what passes the lacteals. Should the lacteals secrete only tissue food, these succeeding glands would have no material to produce tissue food, therefore they transport more than they secrete; it is the key to their function, for as is well known, they absorb (using that objectionable term) many injurious substances, even poisons. It is not their function to *select,* but to transport all liquid substances from the alimentary canal to the veins, whether these substances are of benefit or an injury. In no sense are the lymphatic glands protective; the system must depend on the selective powers of the organism, and the eliminative powers of the glands in the circulatory apparatus, to safeguard its health. It will readily be seen from this that the blood is not a pure fluid, but on the contrary a very impure one, in fact it is loaded with impurities, *especially after feeding.* I believe this is the explanation of glycogen in the liver, that it is but a stage of the metamorphosis of the by-products of the lymphatics on its career of elimination. The experiment proving that there is more sugar in the vein leaving the liver than in the vein going to it (portal vein) does not prove that sugar is absorbed from the intestine; the experiment is entirely inadequate. It is an argument which favors my theory as much as it favors that of absorption, but is proof of neither.

Having studied the arrangement whereby the great lymphatic system and the alimentary canal are connected, let us now pass into the alimentary canal itself. There is no question that in this apparatus the food is prepared for further *elaboration.* I am emphasizing this word elaboration, for it means so much in physiology, and yet so little; it is always leading us towards something, something that is understood to be of the greatest importance, but to the great discouragement of the student never reaches anywhere. In attempting to solve the problem that confronted me, I have given elaboration a purpose and an object. Rightly or wrongly I have determined that the aim and end of elaboration is the tissue food. Any analysis or criticism of my

paper should begin at my view-point. The question to be answered first is, "Is my view-point admissible, can structural anatomy be interpreted in the light of physiology, and *vice versa,* and is it a correct inference that when the food arrives at the tissues elaboration ends?" If not, most that I have said is error; but if admissible, the greater part of the analyses and criticism directed against my views has been misdirected.

As so much depends on my view-point, I would like to discuss it for a moment. It may be divided into two parts: (1) That structural anatomy can be interpreted by the physiological phenomena occurring in the parts to be interpreted; (2) that the particular purpose of the organism is to produce tissue food. If the first part were applied to a man-made machine, it would be synonymous to saying that as a machine is built, so it must work, and as it works, so it must be built.

Of the first part of my view-point, I do not imagine there will be any question; of the second, however, there may be a great deal. Therefore I would like to discuss it a little further. I have described what I mean by tissue food, but even if I am in error as to its exact nature, or even if tissue food is non-existent, my view-point is correct, if you but admit that the end of elaboration is the production of some definite substance, and the destination of this substance is the tissues.

Having explained what I mean by the tissue food, I will now attempt to determine its composition. To do this, even approximately, we must follow the liquid food from the alimentary canal to the tissues, *but no further.* The tissues must be recognized as the destination of food, *its destination, anatomically and physiologically,* otherwise my theory falls to the ground.

We know the composition of food when it begins its journey; we know its composition when it arrives at the tissues; we know each and every chemical, or other change, occurring while *en route,* and we can locate every histological structure in which each change occurs. The first of a series of such changes occurs in the alimentary canal, a second series takes place in the liver (according to our text-books), a third occurs in the alimentary

lymphatics. We have followed these changes to their ultimate, and found that but one of these products is found in the tissue plasma—that one is *the serum of the chyle*. This fluid and the tissue plasma are very similar in composition, and I consider it a justifiable inference that the serum of the chyle is the tissue food, or the nearest approach to this substance, that is never found in its purity, but always in combination. The natural deduction is that the alimentary canal and the great lymphatic system produce the tissue food, and this is the theory I wish to advance. I have explained how the alimentary lymphatics, continuing the manufacture of the tissue food, the same process is continued by the systemic lymphatics, the circulatory apparatus constituting a connecting link between the separated parts of the great lymphatic gland, or system, as our text-books designate it.

I wish now to refer to the theory of absorption. By absorption I mean that particular process whereby food is absorbed from the alimentary canal and transported to the circulatory apparatus by the blood circulating through the mesenteric veins. This function is not specially provided for by any anatomical arrangement; the mesenteric arteries, it is true, go to the alimentary canal, but they go to carry plasma to its secreting cells, and the returning venous blood goes to the liver, but, anatomically speaking, the mesenteric veins are distinct from the alimentary canal, just as distinct as the lacteals would be if they were devoid of cells. As far as I can discover, our text-books claim no anatomical connection between the two apparatuses, the function of absorption being the result of physical laws, and not the result of any particular anatomical design on the part of the organism as I claim for the lacteals and, for that matter, for all physiological phenomena. If, therefore, absorption is a fact, my viewpoint has met an obstacle that is very difficult to overcome; but, unless it is overcome, it is impossible to study, or rather interpret, anatomy in the light of physiology or *vice versa*, and the organism, unlike a man-made machine, works as it is not built to work, and performs a very important function for which no anatomical

arrangement has been provided. Absorption appears to be a physiological incident, in a man-made machine it would spell failure.

If absorption is a fact, of course it must be accepted; but we must also accept all the anatomical and physiological contradictions which go with it. Let us interpret those contradictions in the light of the glycogenic function of the liver. Sugar is absorbed by the blood in the mesenteric veins and carried to the liver, where it is converted into glycogen and stored up for future use. To be of future use, it re-enters the circulation to be further elaborated, and meets the fate of most elaborated products—it ends nowhere in particular. From my view-point, it ends in the tissues, and ends in them as an integral part of the tissue food, or else it is of no value whatever. If we follow the glycogen from the liver onward (whether it is glycogen or some derivative of glycogen, makes no difference), and we find it mixing with the chyle (blood) as it empties from the thoracic duct, and as one fluid, they both find their way to the tissues. This is a most extraordinary occurrence if glycogen is as important a substance as is claimed for it, and productive of many contradictory inferences. It is a very strange meeting this of the bile acids, glycogen and chyle, and eventually the tissue-waste products and the corpuscles, and a still stranger meeting place. When we consider the size of the liver, its enormous blood supply, the vast amount of bile and glycogen it secretes, the explanation of its functions and its purpose in the organism, as given in our text-books, would hardly explain its importance in a man-made machine.

These physiological contradictions are rivalled by those found in the anatomical arrangement of the blood vessels which have to do with absorption. The portal vein is but a receptacle of the blood (the venous blood, remember) of the mesenteric, pancreatic and splenic veins; this is a very strange arrangement to carry sugar to the liver; it is just as strange if their purpose is to secrete bile. As far as I can discover, our text-books offer no explanation at all. These veins carry blood from the stomach, pancreas

and spleen, so the liver receives their venous blood and its own arterial blood, yet bile and glycogen are highly oxidized products. This chemical fact is not explained by our text-books, nor is any explanation offered why the liver continues the work of the pancreas and spleen on the blood, nor do they explain why the blood should enter the circulatory apparatus in two places: one at the entrance of the hepatic vein, the other at the opening of the thoracic duct; why it should reach the tissues at different times, for the hepatic vein being further away from the tissues than the thoracic duct, it must reach there at different times. So it is a logical conclusion there are two tissue foods, which sounds as incongruous as having two kinds of milk. Physiologically and anatomically, the function of absorption presents many contradictions.

Just a word of explanation regarding the term *elaboration*. I have used this term to mean a function confined to the production of tissue food, it is therefore confined to the production of serum. Chemically speaking, and anatomically speaking elaboration is possible only in the alimentary canal and in the great lymphatic system.

A final word regarding hunger, thirst and asphyxiation. I stated in my last paper hunger was *peculiar* to the alimentary canal, thirst to the lymphatics, and asphyxiation to the lungs. Hunger is a cry of the tissues for food, for nutriment; the stomach is the spokesman for the alimentary canal; thirst is a cry of the tissues for water, but water is included in tissue food; this cry of the tissues is responded to by the lymphatics, because it is the function of these glands to produce a liquid food, and the lymphatics of the throat constitute the spokesmen of that gland. The cry of the tissues for oxygen is a cry of *distress;* they are becoming poisoned, and the antitoxin to these poisons is oxygen,

NOTE—"G. E. Stahl, relying less on facts than one theoretical reasoning, endeavored to claim for the liver a very comprehensive pathological importance. He called in question the opinion as to the exclusive participation of the lacteals in the absorption of nutrition, which, since the discovery of the thoracic duct, had gradually become generally admitted; and at the same time he maintained that as large a quantity of chyle was carried with the blood through the mesenteric veins to the liver as that which found its entrance into the system through the lacteals." (Frerichs, "Diseases of the Liver.")

so the lung cells respond by their convulsive movements. In this way we divide the three apparatuses which control the destiny of the tissues in such great part: one to receive the food, the other to elaborate it into tissue food, the other to eliminate the by-products and waste, and each has its particular spokesman.

GROWING EVIDENCE THAT THE HORSE AND NOT THE MOTOR TRUCK IS MOST ECONOMICAL FOR SHORT HAULS.—Manufacturers of heavy trucks—the horse drawn kind—report an unusual demand for that type of vehicle this spring. Accumulative evidence goes to show that while the motor truck has its uses, and very valuable uses at that, the short haul is more economically handled through the medium of the horse drawn vehicle. A well-known truckman in New York said last week:

"I have given up the use of motor trucks. The life of a motor truck is short, and I find that in moving merchandise in mixed quantities over short hauls I can do it more cheaply and expeditiously than I can by using motor trucks."

The largest coal dealer in Detroit has returned to the horse-drawn vehicle. He says he was induced to change for the reason that his motor trucks were in the shop too often for repairs. He stated that he had kept track of the running expense of a motor truck for one year, and that it cost $1,921.71.

"When I saw what motor trucks were costing," said this man, "I sold my motor trucks and went back to the horse."

An ice cream establishment in this city, through its manager, asserts that it cost the firm nearly half a million dollars to find out that the motor truck was not adapted to their business. This statement, and others of a like character, have been received from several quarters this spring by the Studebakers, of this city, and as the demand for horse-drawn trucks has advanced twenty-five per cent over last year horse-drawn vehicle men are confident that the horse is coming into his own again, and they are correspondingly happy.—(New York *Herald.*)

HAVE OPENED A NEW VETERINARY HOSPITAL.—Drs. Hagyard and Shannon, Lexington, Kentucky, have opened a new hospital, which they moved into about May 1, 1914. We congratulate them on their enterprise and hope that they may have a long and prosperous career there.

SOME VERMINOUS PARASITES OF SOLIPEDS.*

By Prof. A. T. Kinsley, Kansas City, Mo.

Parasitism occurs in various degrees. Some parasites pass their entire life cycle upon their host, others visit their host only for supply of nutriment, and still others pass only a portion of their life cycle on or in their hosts, which they leave to undergo metamorphosis elsewhere.

Internal parasites of solipeds are many, and the diseases they produce are a large factor in the routine practice of veterinarians in the agricultural districts of the great Mississippi valley.

Internal parasites injure their host by: a. Abstraction of nutriment. *b.* Blood suction. *c.* Production of hemolytic or irritating chemical substances. *d.* Mechanically, injury to tissue of obstruction of natural passages.

Practically all of the more important internal parasites of solipeds pass the larval and adult stage of their life cycle in their hosts. They are, with few exceptions, oviparous, the ova being discharged in some of the body excretions. The ova hatch into the embryo, the length of time of incubation being variable and largely dependent upon environmental temperature. The embryo stage is usually passed on vegetation or in water, although this stage of some internal parasites is still unknown. The embryo is the usual form in which the parasite is introduced into the host.

The source of parasites is a very important consideration in efficient sanitation, and a knowledge of the habitat and the vitality of parasites external to their host is indispensable in controlling parasitic diseases. Practically all of the intestinal parasites under consideration in this discussion pass some part of their life cycle outside of their host, and, as a rule, this portion of their life cycle is passed in wet, marshy, improperly

* Presented to the Illinois State Veterinary Medical Association, at Chicago.

drained soil, and especially in climates where there is no severe cold weather. The embryo of the pulmonary strongyle is said to be destroyed in a few days by water or damp soil, its longevity being favored by dryness.

The vitality of the embryo of most of the internal parasites is not definitely known, but they are known to be capable of withstanding rather intensive external environments, such as desiccation and marked temperature variations. However, it is thought that they have little resistance to putrefactive changes of vegetation or the water they inhabit. Their capability of withstanding various environmental influences that are usually destructive to other forms of life further complicates the problem of control work. Just how long the vegetation, water or soil of a pasture or premises will remain infested after diseased animals have been removed will depend largely upon climatic conditions and upon the nature of the vegetation and soil. Under the most adverse conditions for the parasite a pasture or premises may be considered free from parasites in from six months to two years.

The usual channel of entrance of internal parasites is the digestive tube, either in food or water that has been contaminated by the discharges of infested animals or by infested land. Pulmonary infestation with the embryo of the strongyle carried upon particles of dust may occur. It is possible that some few of the internal parasites of solipeds are introduced through the skin, either directly through open lesions or indirectly through the agency of some external parasite, as the mosquito.

The lesions produced by parasites are quite variable. The general lesions produced by blood-sucking parasites are anemia, emaciation and frequently œdema. Local lesions of varying extent are usually also evident. The special lesions will vary according to the parasite in question; pulmonary strongyle produces bronchitis and pneumonia of a catarrhal type. The larva of the Sclerostoma equinum produces thrombosis and usually aneurismal dilatations. Inflammation, degeneration and necrosis are frequently produced by a variety of intestinal parasites.

Necrotic dermatitis and a number of other lesions may be produced by parasites.

The avenue of elimination of the parasite, particularly when it is in the stage or cycle in which it can exist external to the host and be capable of infesting another host, is quite important in the prevention and spread of parasitic diseases. The ova or embryo of intestinal parasites are eliminated in the intestinal excretions. The ova or embryo of pulmonary parasites are eliminated in the discharges from the lung. By proper disposal of excretions containing ova, embryo, or adult parasites, the possibility of infestation will be diminished, and by the persistent proper disposal of the infested excretions parasites can ultimately be eradicated.

The symptoms of parasitic infestation are quite variable. The general symptoms resulting from blood-sucking parasites are anemia, œdema, emaciation and unthriftiness. As a general rule either young animals or aged animals are more frequently affected. The specific symptoms will vary according to the nature of the parasite, the extent of infestation and the age and resistance of the infested animal. The infestation of the lungs result in pulmonary disturbances evidenced by cough, muco-purulent discharge from the nose, moist rales, and possibly solidified areas in the lung. The cough occasioned by pulmonary parasites is characterized by several expulsive efforts occurring in rapid succession. The nasal discharge is muco-purulent in character and may contain ova and disintegrated parasites which can be observed by microscopic examination. Intestinal parasites may be intensive blood suckers and deplete the animal body, as well as producing a catarrhal enteritis which may cause inappetence or a capricious appetite. There will also be parasites in some stage of development in the feces.

The diagnosis of parasitism in the animal body may or may not be difficult, depending upon the extent of infestation and upon the location in the animal body. If there are only a few invading parasites, the host may appear to be normal, and the diagnosis of parasitism be practically impossible. The finding

of parasites in some stage of development in the excretions is positive evidence of parasitism. Thus the finding of the parasite in the nasal discharge or intestinal excretions in some of its stages of development is absolute proof of parasitic infestation of the respiratory or digestive organs. An eosinophilia evidenced by a blood examination is additional evidence in the diagnosis of parasitism.

In prognosticating the outcome of an animal infested with parasites, the resistance and general condition of the animal, as well as the extent of infestation must always be taken into consideration. A young animal that is intensely infested with blood-sucking parasites, located either in the intestine or lung, should be considered as a doubtful case. A fully developed horse in good condition, with only slight infestation, will usually recover if properly treated.

Because of the difficulties of treatment it is far better to prevent infestation than to treat animals that are infested.

Prophylaxis includes the quarantining of infested animals and the proper disposal of their discharges. It also includes the proper consideration of pasture land, hay and water supply, and the cleanliness of the barn and yards. Grass or hay from improperly drained low marshy land or farm lands that retain the drainage from infested lands should be excluded from the diet. Surface water is frequently a carrier of parasites and should be guarded against.

The curative treatment will be discussed in relation with the consideration of each parasite.

Because of the magnitude of this subject, only the most important parasites will be considered.

Ascaris Megalocephala, the round worms, or what are called the lumbricoids, are quite common, particularly in animals of one to two years of age. The parasites are usually obtained by the host from water, vegetable matter, pasture land, hay or any food stuff contaminated by dust containing the embryos. The adult lives in the small intestine. The ova are discharged from the host in the intestinal excrements. They

hatch into embryos which have very great vitality. It is claimed they have persisted on vegetable matter, in infested pastures, for as much as two years.

The usual lesions produced by this parasite are catarrhal enteritis, which in extreme cases may be associated with depletion of the body and in some instances obstruction of the bile and pancreatic ducts, or the intestine itself. A few instances are on record where these parasites have perforated the mucous membrane and the entire intestinal structures, permitting infection, resulting in fatal peritonitis.

The symptoms consist of rough coat, unthriftiness, indigestion, emaciation, perianal mucous deposits, and in cases in which the hepatic and pancreatic ducts are obstructed, disturbances of the liver and pancreatic functions respectively. In a few instances there may be obstruction of the intestine sufficient to produce fatal colic.

The most common diagnostic evidence of infestation by these parasites is perianal mucous deposits, and the presence of these particular parasites may be proven by the finding of the ova or the adults in the intestinal excrements.

The treatment of this condition, as of other parasitic disturbances, should be considered from two viewpoints, namely, preventive and curative. The prophylactic treatment consists in preventing infestation by keeping the barns and yards clean, properly treating the manure heaps, so that ova or embryo contained therein will be destroyed, keeping the animals off of the pasture lands that are known to be infested and by feeding food stuffs that are known to be free from infestation as well as giving water only from deep wells.

The curative treatment is not always successful, particularly the first attempt. Some have found that two-dram doses of tartar emetic on the morning feed for three or four days, followed by a brisk purgative, is efficient; others have successfully used one to two-dram doses of turpentine, given in milk or linseed oil. Three or four-dram doses of santonin has been recommended, but is rather expensive. Iron sulphate in two-dram

doses, to which is added five or ten grains of arsenic trioxid, has been found quite efficient. Beechwood creosote, given in capsules in one-half dram doses, has given good results where other agents have failed.

OXYURIS CURVULA AND MASTIGODES, OR PIN WORMS, are quite common in solipeds in this section of the country. Their life cycle is similar to that of the round worm. The embryos are obtained by solipeds in food or water, and they rapidly develop into larvae and adults in the intestine. These parasites are located in the large intestine (caecum, colon and rectum). Unless pin worms occur in large numbers, they do not produce general lesions. In extreme cases of infestation there may be slight anemia and limited emaciation. They locally produce inflammation of the mucous membrane and occasionally the eggs, embryo and larva may be found in the submucosa in the infested area, rarely they are found in the capillaries.

The diagnosis of this condition is dependent upon finding the pin worm in the fecal matter.

The most common symptoms of pin worm infestation is anal pruritis, perianal mucous deposits, indigestion and, in extreme cases, colic.

The prevention of infestation by pin worms consists in eliminating food and water that are likely to be contaminated. Therapeutically we find this parasite much more difficult to control and eradicate from the host than the round worm. Enemas of quassia chips or even a dilute solution of creolin or kreso, succeeded by a brisk purgative, is frequently quite efficient. It is not possible, however, by this method to eradicate the parasite that inhabit the caecum and the anterior portion of the colon, and for their destruction it is necessary to use similar or the same agents that were recommended in the treatment of the round worm. It may be found necessary to prolong the treatment for the destruction of the pin worm.

SCLERASTOMA EQUINUM, OR STRONGYLUS ARMATUS, is one of the most common and perhaps most destructive of all internal parasites of solipeds in this section of the country. In

different areas it has been found that from one to one hundred per cent. of all solipeds are infested. The life cycle of this parasite varies. The ova hatch, either in the intestines or external to the host in the feces, into a small globular embryo which may live for months. The embryo inhabits water, also vegetable matter grown near ponds where the embryo hatch, and this is usually the source of infestation. After the embryos are ingested in the food or water, they develop in the intestine of the host into asexual larvae, some of which bore through the mucous membrane, becoming encysted in the submucosa, others, passing through the intestinal wall, meander out into various organs and tissues, still others attack blood vessels where they cause inflammation, and later a degeneration succeeded by a dilatation which is followed by thrombic formation. A larva usually remains in the thrombus where it develops, and later it migrates along in the vessel until it passes into the capillaries where it perforates the tissues, and if location is favorable it enters the lumen of the intestine, where it becomes sexually mature and attaches to the mucous membrane of the intestine. Many of the larvae encysted in the submucosa also later pass into the intestine and mature.

The location of this parasite in the animal body is variable so far as the larval stage is concerned. They have been found in practically all tissues. The blood vessels most particularly invaded are the mesenteric arteries, anterior and posterior, coelic axis, spermatic artery and the posterior aorta. The adult worms are found attached to the mucous membrane in the large intestine.

The lesions produced by *Sclerastoma equinum* vary according to the extent of infestation. Anemia prevails as a result of direct abstraction of the blood by the parasite, and also as a result of hemolytic action of a poisonous substance secreted by the parasite. There may also be emaciation. Locally it produces inflammation of the intestinal mucosa. The larvae produce necrosis, degeneration, aneurism, thrombosis, embolism, ischemia or hyperemia, as well as cysts, which may later un-

dergo changes, ultimately becoming fibrous cicatrices or calcified necrotic masses in the submucosa, liver, pancreas, lung or other tissue.

The general symptoms of infestation by this parasite is anemia, indigestion, colic, perianal deposits and the elimination of the parasite in the pus. Special symptoms resulting from the lesions produced by the migrating larvae consist of circulatory disturbances in various organs, such as muscle, liver, brain, intestines, kidneys, etc.

Preventative treatment consists in the feeding of non-infested food stuff and the giving of pure water, also maintaining the animals in barns and yards that are known to be free of the embryo of this parasite.

Curative treatment is efficient only in ridding the body of the adult form of this parasite, the larval form being located in the various tissues cannot be destroyed by any known medicament that would not be equally destructive to the animal tissues. The adult may be destroyed by treatment prescribed for round worms and pin worms. Any line of treatment should be persisted in for sufficient length of time to be certain that the adults have been destroyed, and then the animal should be given a brisk purgative.

SCLERASTOMA TETRACANTHUM. This parasite is frequently associated with the sclerastoma equinum. It prevails in practically all sections of the country. Its life cycle and method of gaining entrance to the animal body is practically identical to that of the sclerastoma equinum. Some have questioned whether or not it constitutes a separate species. The larval form of this parasite is invariably encysted in the submucosa, where, after developing into maturity, it enters the intestine and attaches to the mucous membrane. Large numbers of the larvae necessarily cause damage to the intestinal wall, and large numbers of the adults damage the mucous membrane of the intestines as well as deplete the abstraction of blood. However, they are less damaging blood suckers and are much less dangerous to solipeds than the sclerastoma equinum.

The symptoms produced consist of unthriftiness and anemia associated with digestive derangements.

The same treatment can be used as that for the sclerastoma equinum.

FILARIA PAPILLOSA. This parasite is more or less prevalent in solipeds throughout the entire United States. The avenue of entrance is not positively known. It is usually found meandering through the tissues in serous cavities, and when in large numbers, in the peritoneal cavity. They may accumulate in sufficient numbers in the tunica vaginalis to occasion a serous inflammation characterized by an excessive outpouring of serous fluid, which accumulates in the vaginal sac producing hydrocele. Occasionally this parasite gains entrance to the aqueous humor of the eye where it occasions more or less disturbance to that organ.

The treatment in general infestation with this filaria is not successful. Cases in which the vaginal tunica or eye are affected may be relieved by operation.

TAENIASIS of solipeds in this section of the country is very uncommon. One farm only in Missouri has been identified as containing animals harboring tape worms.

STRONGYLUS ARNFIELDI, OR LUNG WORM. This parasite is not generally prevalent in any portion of the United States. It is destroyed external to the host in a very short time by exposure to wet or damp environments, and since practically the entire Mississippi Valley is amply supplied with moisture, it would be rather exceptional to find this parasite in sufficient numbers to cause alarm.

The adults are found in the bronchial tubes and bronchiales, the ova and embryo being discharged in the excretions from the bronchial tubes. They gain entrance into the host by the feeding of contaminated food stuff and water, or by inhalation. The exact manner in which those that are ingested reach the bronchial tubes has not been positively determined. The adults are blood suckers and occasion an inflammation which is associated with an accumulation of muco-purulent sub-

stance in the bronchial tubes and bronchioles, which in turn favors infection resulting in catarrhal inflammation and in some instances the occlusion of the bronchioles and collapse of the air cells.

The symptoms in the initial stages of the disease consists of an occasional cough. As the parasites become more numerous, the cough becomes more frequent and is of a paroxysmal character. The animal frequently coughs until it falls to the ground exhausted. Emaciation is rather rapid, the animals become weak, depressed and die. If the discharge from the nose is examined, it will be found to contain disintegrated adult parasites, many ova and occasionally an embryo.

Prevention consists in the quarantining of the affected animals, keeping the premises free from dust by frequently sprinkling with a parasiticide and giving the animals clean, wholesome food and water. The treatment consists in the application of volatile drugs that may be inhaled by the animal and which will facilitate removal of the bronchial contents and will destroy the parasite, as oil of eucalyptus, iodine and turpentine. Medicaments may be introduced either in the form of a vapor or spray.

CONTINUES TO GROW IN STRENGTH AND INFLUENCE.—The National Association Allied Horse Interests elected twenty-nine new members in April, and the publicity work which this organization is carrying on is being reflected in the attention which is being given to the horse in many leading periodicals. Agencies for the promotion of the usefulness of the Association are being established as fast as possible in every State in the Union, and possibly slowly, but nevertheless surely, the original plans of the Association are being consummated. If only one out of every hundred horse lovers in the United States co-operates in making the N. A. A. H. I. a success, the work it can accomplish along comprehensive lines will be far-reaching in its effects.—(*The Horse Lover.*)

DISCUSSION OF PROFESSOR KINSLEY'S PAPER.

By Dr. H. A. Pressler, Fairbury, Ill.

I have listened with interest to the very able paper by the distinguished and learned gentleman, its author.

I say with interest, because to me it is the most interesting subject of the present time. I believe the intestinal parasite is directly and indirectly the cause of more trouble than we have even suspected in the past.

I wish just briefly to speak of those different intestinal parasites which I consider produce the more varied and harmful results.

During the past twenty years of active practice I have had perhaps as much, if not more, experience with these pests than any one present here to-day. In fact, so familiar have I become with the symptoms and the appearance of the horses that are infested that when a man comes into my office and begins with a description, I have reached a conclusion as to the cause of the trouble before he ends his tale of woe.

I have a scope of territory along a small stream, which runs in a south and western direction for a distance of perhaps six or seven miles; along this stream there is more or less timber. This scope of territory seems to harbor more of the special parasite of which I shall speak than all the rest of my field of practice.

Some years ago (perhaps nineteen) a man came to me with the request to go with him and see a colt which he had learned was sick in the timber pasture; it was in the summer and the water in the creek was very low, there being no running water and only in the lowest parts of the creek bed was there any water for the horses in the pasture. We found the colt down, and he could not get it up; I knew it was nearly dead, but just how long it had been sick nobody knew. There not being sufficient symptoms to guide me in making a diagnosis, others than

unthrifty condition, pale mucous membrane and general weakened condition, I requested the owner to go with me the following day and we would hold a post mortem, which we did. We found a quantity of the *Sclerastoma Tetracanthum* in the large bowel, and placing some in a bottle I took them with me as a curiosity, not knowing positively whether they were the cause of the death of the colt or not. I presented the specimen to Dr. Stringer who had been practicing in this community for a number of years; he informed me of the nature of the parasite, which had caused the death of the colt.

A few years later I was called to a farm not far from the one just mentioned. I found three grown horses lying dead; the three were as nicely in a line as if they had been hauled by a team of horses; they were about the same distance apart. Three or four more were standing near with head drooped, and muzzle swollen, some blood and mucus discharged from anus and the nostrils, very weak and muscles in a tremor; discolored mucous membranes. I was somewhat alarmed and very much interested in the man's animals. First, because he was a well-to-do farmer and stock man, while I was a new man in the field and did not wish to make a blunder; in fact, things looked to me as if some contagious disease had broken out, and I did not know what the result might be.

I requested that he call counsel, which he did, calling Dr. Stringer. I think I am correct when I say that Dr. Stringer was surprised at the scene of three large draft horses lying in such a position, and three or four more nearly dead, with others more or less affected. Strange as it may seem, neither of us suspected that the intestinal parasite was the cause of the trouble. We posted one and examined the lungs, liver, heart, spleen, kidneys and throat, but did not examine the contents of the colon and caecum. The next one we proceeded with in like manner and were about to pass to the third dead animal when we thought to examine the large bowel, which contained innumerable quantities of the *Sclerastoma Tetracanthum* and *Strongylus Armatus*, which told the story.

Had we not thought to examine the colon and caecum, there doubtless would have been placed in veterinary literature a full and complete history of a new and fatal malady, the germ of which had not yet been isolated, so small was the germ that the strongest microscopic lense failed to detect and the finest porcelain filter would not hold back. Four more horses died within the next forty-eight hours. The other animals were removed to a different place, if I remember correctly were placed in the stable and treated for some time without the death of another animal.

About ten years ago a man shipped into our town two carloads of western horses, principally two-year-olds. They had a rather unthrifty appearance. After some time of unsuccessful attempt to dispose of these horses, they were finally purchased at a supposed bargain by a farmer living on a farm adjoining the one I just mentioned, the farms being separated only by the public highway. This man took the colts and turned them in the woods and stalk field together with his own native colts and horses. They began to die, he called me, and it was plain to see the cause; the sick animals passed the parasites in quantities.

The animals being unbroken and wild, it was a task to give medicine to them, the owner after more or less effort giving up; and during that winter lost fifteen head, some if this number being his native colts.

About three years ago a renter living on the same farm lost five or six head from the same parasite within a period of perhaps less than two weeks. The owner was of a rather peculiar and superstitious character, and attributed the cause of the death of his horses to "milk sick," which was said to have caused the death of his cow some time during that summer.

A few weeks ago I was called to a man's premises to see and examine a Shetland pony which he had found dead in the pasture. He informed me that this was the second one that he had lost within a few days, and that he feared a contagious disease was going to take the rest of the herd. It was too late

in the evening for me to post the animal, but I informed him that it was nothing contagious and that it was due to intestinal parasites. Promising to return in the morning, I had him dig a hole and have things ready to bury the pony; after examination I found the typical hemorrhagic spots, with more or less inflamed patches, under the mucous membrane, but there were few, if any, of the parasites visible.

It is a very peculiar fact that in some cases, where an animal has lain for some time, the parasites dissolve, digest or disintegrate.

I have placed them in bottles of water and find some will disappear and there remain a sediment at the bottom of the bottle.

Another peculiar fact I have discovered, that in some cases an animal may be badly affected, and there cannot be found in its feces any of the parasites.

On post mortem in a number of these cases I found the intestinal tract inhabited by thousands of the worms.

I have spoken of the deaths of animals which have occurred in certain localities in along this creek and timber pasture; but I find more or less of the parasites in question in *all* directions.

Perhaps a month ago, I was called to a farm near what was originally a large grove containing seven hundred or a thousand acres of timber, and on the south and centre was a large pond, which some years ago was dredged out and now is under cultivation. I refer to Oliver's Grove, of which place doubtless some of you have heard. This man had a two-year-old colt that was staggering about, seemed partially paralyzed in its hind legs, and very weak in its front legs, was thin in flesh, hair rather long, mucous membrane pale, and upon examination of feces found both the *Sclerastoma Tetracanthum* and *Strongylus Armatus*. The colt had been previously treated for stomach staggers. I saw the colt two or three weeks ago, and it was able to trot away with scarcely a hitch or stagger. In this case the staggering was due doubtless to the *Strongylus Armatus*.

I was called in consultation during the month of August last summer; the case was a large sorrel mare which the owner valued at two hundred and fifty dollars. The animal was insured. The case had no history other than that the owner, on going out "choring," found the mare down near a hedge fence. He called in a licensed veterinarian, who pronounced it lightning stroke. After the animal had lain for about three days, he called me. After examining and obtaining what little history there was to the case, I told him there was no evidence of lightning stroke, and suspected paralysis due to an embolism, caused by the *Strongylus Equinum*. I informed him that the animal probably would not recover, and requested that I might be present at the post mortem, which would prove whether the animal died from lightning stroke or worms. In about five days the owner decided that the proper thing was to kill the mare.

It was the most typical case of intestinal parasites, and their effect I ever saw; embolism in the posterior aorta. We found the *Strongylus Armatus* both in the aorta and the mesenteric arteries. The colon and caecum contained the parasites in great quantities.

Now here I wish to say that I believe *most* cases that we call paraplegia, if not *all* of them, are due to this parasite, *Sclerostoma Equinum*.

Drafters Bring Good Prices.—A sale of draft horses recently held by North & Robinson at Grand Island, Neb., furnishes an excellent illustration of the value of good stock at the present time.

The entire lot consisted of 40 head of Percherons, Shires and Belgians, all animals of good quality, and consequently high prices ruled. Percherons were the favorites, one stallion bringing $1,750 and anothr $1,500. Twenty-four Percherons sold at an average price of $630, while the entire lot of 40 head averaged $539.—(*The Horse Lover.*)

MAINE LIVE STOCK INDUSTRY.*

By Dr. A. Joly, Live Stock Sanitary Commissioner, Waterville, Me.

During the short time in office I have found out that the live stock sanitary commissioner is expected to be a veterinarian, a sanitarian, a pathologist, a bacteriologist, a financier and a farmer; in other words, a sort of encyclopedia; but I did not know that he should also be a preacher. No wonder that our governor considered a long time my appointment. I am told that he was afraid that the farmers would not understand me.

Perhaps it might be well at this time, for me to apologize for my defective pronunciation of the English language. Knowing the generosity of the American people, I can, in advance, depend upon your indulgence, for I want you to give me credit for my persistence, and take into consideration that twenty-four years ago I came into Maine, located in Waterville, with the firm purpose of learning the language of Shakespeare. I am still at it, and my friends have convinced me to give up all hope of returning to my native land.

The subject assigned to me is so vast and so important that, in the brief space of twenty minutes allotted me, I can offer you but a few thoughts to consider.

Maine has over $28,000,000 worth of live stock. Maine appropriates $50,000 a year to carry out its sanitary laws, governing the moving of domestic animals, facilitating and encouraging the live stock interests, and extirpating or controlling all infectious and contagious diseases that may exist among cattle, horses, sheep and swine—and especially tuberculosis.

During this past year we have condemned 1,021 animals that were a menace to public health and to our live stock industry.

Sixty-seven horses were found affected with glanders, and 954 head of cattle were condemned as tuberculous. Nevertheless we feel that we have glanders and even tuberculosis under

* Read before the State Board of Trade, at Portland, March, 1914.

control, and can keep it so if our local boards of health will co-operate with us.

It is of the greatest importance that our milk supply comes from tested herds; it is a protection that we owe to the consumers. It cannot be denied that bovine infection is transmissible to man and principally to infants through tuberculous milk. This fact has been established. No local board of health should allow milk sold unless produced by a tuberculin-tested animal; and no man has a right to claim that his cows are free from tuberculosis, unless he has had them tested. So it is up to you, business men of the State Board of Trade, to see that your respective localities elect men on your local boards of health who understand their duties and see that such laws are carried out.

Maine with 60,000 farms and with 3,000,000 acres of tillable land—an average per capita of about four acres—it would seem, should produce at least what it consumes. Yet statistics show that we import over seven million dollars and a half worth of western grain yearly; we import butter, cheese and even cream.

We import 650 carcasses of beef a week at an approximate cost of $2,839,200 a year. With the importation of mutton, pork and canned meat it would figure out to over three million dollars a year.

During 1913 we imported 8,000 horses, mostly draft horses, at a cost of $1,500,000. Our importation in grain, cattle and horses amounts to $12,000,000 a year.

Maine should raise its own horses. Reports have been received from about 10,000 correspondents of the Bureau of Statistics of the Department of Agriculture upon the cost of raising colts on farms to the age of three years. The average for the United States is found to be $104. Even at this apparently high cost it would be profitable.

To begin with, it would mean $104 saved, $208 on a pair, and at the age of three, a pair of draft horses will earn far more than their living, and at the age of four or five, they would be worth at least $500.

Farmers should buy mares instead of geldings. They do not

cost any more to feed and they can be bred at such a time of the year as not to interfere much with the work on the farms.

To encourage horse breeding, perhaps it might be advisable for the state to own a few stallions, systematically distributed throughout the breeding districts during the season as is done in France, where all breeding stallions are either owned by the government or have government authority to stand for service.

Thirty years ago Maine had 351,000 head of cattle, 105,000 more head than she has at the present time. Thirty years ago Maine had 577,000 sheep, 457,000 more than she has to-day. We have 40,000 swine compared with 71,000 in 1884. With the decrease in live stock, the improved land has been reduced by 124,000 acres.

In order to render justice to our tilling land, we must raise more live stock, and with more live stock it means more fertilization, which would allow us to raise our own grain.

Of all the various kinds of stock raising, dairying is the most profitable, and it pays a higher possible income when properly conducted than any customary vocation on the farm. At the same time it will put the farm in a higher state of cultivation. But every farmer in Maine cannot be a dairyman; a man has to have some adaption in that direction. While a man might fail as a dairyman, he might be successful as a raiser of beef animals.

Beef can be raised at a profit in Maine; there is no question about it, and why not? Our predecessors thirty-five years ago raised beef and were prosperous and raised large families, and Maine was richer by 124,000 acres of improved land than she is to-day.

The raising and fattening of prime beef is the perpetual asset and industry of the farmers of England and Scotland, and has been for 150 years. All the world knows to what degree these British farmers have been successful, and they can raise beef at a profit, even on high-priced land.

Canada, with its cold climate and long winters, exported to this country during 1913 210,978 head of cattle, valued at $6,871,667.

If there was no profit for the Canadian farmers in raising beef animals, the small province of Saskatchewan would not have appropriated $500,000 to foster its live stock industry.

Beef and dairy cattle, hogs and the mutton breed of sheep are to be accepted as security by the provincial government, provided all males are pure bred and females are high grades.

The Grand Championship of the International Live Stock Show, held in Chicago last December, was awarded to a steer, fed on anything but corn, and which was raised by J. D. McGregor, of Manitoba.

The same can be done in Maine; but we must improve our method of farming and adopt the system of crop by rotation. Much of our land, it is true, is too rough for the cultivation of crops and must be kept in permanent pastures; but these same pastures could be improved with little work. Our farms should be fenced and cross-fenced, so that hay fields could be used as pastures at certain times of the season when the grass begins to fail.

On the 8th of last December, on my way from Chicago to Montreal, I noticed, going through Michigan and the Province of Ontario, herds of cattle, hogs and flocks of sheep grazing in hay fields, well fenced.

Our sheep industry is deplorably on the decrease, when sheep can be raised at a profit and with hardly any labor.

Swine industry is also neglected when it should be considered as a mortgage lifter.

"Live stock upon the farm should be regarded as machines for manufacturing agricultural products into forms more concentrated and possessed of a higher value. These products can be shipped to better advantage than the materials could be from which they are made, since ordinarily the cost of shipping decreases with the increase in the concentration of the product shipped. The concentration thus secured is usually very marked, as, for instance, when bulky foods are turned into milk and flesh. In addition to the freight thus saved, much coarse and bulk food grown upon the farm, otherwise largely wasted, is given a money value.

"The straw of what is termed the small grains and corn stover—that is, corn stalks without corn—would be turned into money."

While the animals are thus employed, so to speak, in manufacturing food into more concentrated products, they give back to the farms the greater part of the fertility contained in the food, where the management is correct.

Whenever, therefore, the living animal is used as a machine, it is important that this living machine do its work to the best advantage, and for that reason animals of the right type should be chosen for the purpose when once decided upon.

For dairy purposes we have the Jersey, the Holstein, the Guernsey, the Ayshire and the Dutch Belted, and for the beef type of cattle we must choose from the Shorthorn, the Hereford, the Polled Durham, the Aberdeen Angus, the Galloway and the Sussex.

We must improve our breed of cattle and get rid of our scrubs as fast as possible. We should have more pure-bred animals, and it does seem that the time has come for Maine to go into raising beef and more sheep and more hogs, when one takes into consideration the shortage of meat animals all through the United States. According to estimate by the Department of Agriculture, a shortage is shown of 18,259,000 meat animals in the United States since 1910. Combined exports of cattle, hogs and sheep during 1913 were valued at only $895,603, compared with $3,553,349 in 1912 and $14,289,509 in 1911, and all prospects are that export trade in live stock during 1914 will be even lighter than that of 1913.

Maine should begin to produce what it consumes and supply its home market. In 1913 we imported 33,800 head of cattle in carcasses to supply our meat market. On the other hand, we shipped to Watertown and Brighton stock yards 35,924 calves. These 35,000 calves should have been kept and raised on our Maine farms for our own consumption. To control our market we must have State meat inspection, for our people want the best

and will not buy uninspected meat. During 1913, Maine shipped 7,580 head of beef animals to Watertown and Brighton stock yards. It is true that a large amount were bologna cows, but there were some 2,500 fat animals from Maine slaughtered in Massachusetts under United States Government Meat Inspection, and part of it was shipped right back to our local market and forced us to pay freight both ways.

To increase our live stock industry, more capital is needed; according to our bank commissioner's report, two-thirds of our 60,000 farmers are free from mortgages, so that our capitalists could be easily secured, and there could be no trouble in raising funds. Mr. G. A. Ryther, vice-president of the National Live Stock Bank of Chicago, says:

"There can be no more desirable loan than one on cattle in the feed lot, making daily gains in weight, as each pound added increases the value of the security. Even in the West, the element of risk has been largely decreased in recent years, as the practice of winter feeding has become general.

"During the past quarter of a century the nature of the business of financing, feeding and grazing operations has undergone a radical change, and to-day we find cattle and sheep paper acceptable by banks in every part of the country. At such live stock centres as Chicago, Kansas City and Omaha, it is standard, but even in New York and New England banking centres this class of security finds keen purchasers. The country banker carries it among his assets with confidence, and private individuals seek it as a means of lucrative investment."

In North Dakota, if a farmer desiring a loan can show he has milch cows and is raising feed, he stands a better chance to get what he wants than the farmer who is growing grain only. Some banks even offer special inducements to settlers to buy cows. One of these banks owns a tract of land which they offer for sale on a milch-cow basis. The scheme is novel and interesting, as it shows how much confidence is had in the future dairying and stock raising possibilities. The terms which the bankers offer to settlers are as follows:

"He must have five milch cows, two mares and enough machinery to grow a crop of alfalfa, corn, millet or other fodder. Nothing else is demanded. With the cows, mares and machinery he may move onto the land without paying a dollar and live on it two years. At the end of that time he agrees to pay $100 of the pricipal and $100 each year afterwards with interest at the rate of 6 per cent. When 60 per cent. of the principal has been paid, the purchaser is given a deed and the bank takes a mortgage for the balance."

Maine live stock industry is the most vital industry of our State, of all other industries combined, and in order to give it a renewed activity and all the necessary encouragement, gentlemen of the State Board of Trade, it demands your moral and financial support, by assuring the farmers who have to take chances with the uncertainty of the weather, that whenever the crops are not adequate to the requirements, they can step in any of our banks and feel that they will be welcomed and readily assisted.

MISSISSIPPI BOARD OF VETERINARY EXAMINERS.—The examination for license to practice veterinary medicine and dentistry in the State of Mississippi will be held at Jackson June 19, 1914.

NORTH CAROLINA STATE VETERINARY MEDICAL EXAMINING BOARD will hold its next examination for license to practice veterinary medicine in the State of North Carolina at Wilson, June 23, 1914, in connection with the meeting of State Veterinary Medical Association, which will be in session there at that time.

NEW YORK STATE BOARD OF VETERINARY MEDICAL EXAMINERS will hold its summer examination for license to practise veterinary medicine in the State of New York on Tuesday, Wednesday, Thursday and Friday, June 23, 24, 25 and 26, 1914, in New York, Albany, Syracuse and Buffalo. Candidates will be notified of the exact place in each city. Make application to Harlan H. Horner, Chief of Examination Division, The University of the State of New York, Albany, N. Y.

STATE VETERINARY BOARD EXAMINATIONS.

By N. S. Mayo, Chicago, Ill.

The examinations given by state examining boards are very important, not only to the candidates for examination, but to the practitioners in that state, as well as the profession at large. These examinations do not appear to have the consideration given them that they deserve.

There are only a few states that do not have laws regulating the practice of veterinary medicine, so that the domain of the itinerant quack who usually "flits between two days" is certainly growing smaller. While the free area for the "simon pure" quack is nearly eliminated, it is important that the individual who hovers in that shadowy region so close to ignorance and quackery that a separating line cannot be drawn, should not have the seal of official approval set upon him. Examinations are always subject to criticism, as they are more or less artificial, and standards vary greatly with different individuals, but they are the best means we have of determining a man's fitness for practice. Personally I believe a combination of written and oral questions to be very desirable, particularly where the candidates are strangers to the examiners. It gives them an opportunity to "size up" the candidate, his ability, qualifications and character, that cannot as well be brought out in a written test only. In many cases where the questions are not clear, a candidate may get entirely on the wrong track through no fault of his own. Most candidates hesitate to ask questions of the board. One question asked by an examining board was to discuss "splenic fever." One of the candidates asked which they wanted, anthrax or Texas fever, and he was told Texas fever. As a result of this question, a number of candidates had to rewrite their papers on this topic.

The preparation of examination questions is very important, and they should be carefully prepared. They should be on the

subject indicated, up to date, and prepared to bring out the candidates' general and specific knowledge on the subject. So called "catch" questions should be avoided as far as possible, and every effort made to give the candidate a "square deal." The following questions *on surgery* were asked recently by a state board of veterinary examiners:

SURGERY.

1. Describe the gall bladder in the ox and horse.
   a. Describe the operation for removing gall stones in the horse.
2. Why does a cow chew her cud and when does she lose it?
   a. How does she regain it?
   b. Describe the œsophageal groove (*Sulcus Oesophageus*).
3. What is the operation for Stringhalt?
   a. Describe the operation.
   b. What is the cause of Stringhalt?
4. Describe the trifacial neurectomy.
   a. Why is this operation done?
5. What is staphylotomy?
   a. Describe this operation.
   b. Why is this operation done?
6. Give technic ligation of the carotid.
   a. Differentiate the circulation of the blood in the brain of the horse and ox.
7. What is keratoma?
   a. Give treatment.
8. Describe aneurism.
   a. Give treatment.
9. Describe paraphymosis.
   a. Give treatment.
10. What is the best treatment for canker and how to apply it?

Here the subject of anatomy, physiology, the impossible and improbable, with some surgery, is scrambled together into a remarkable conglomeration.

We hope some of our skilled surgeons will tell us how they have removed the gall stones from a horse or performed trifacial neurectomy for facial neuralgia in the horse or cow. With such an amount and range of practical operations that should be performed by the average veterinarian, it is remarkable that so few were included in this list of questions.

The variability of standards set for practice is probably as great as is the variation in size of the states. This should not be so.

A movement has been started and is making some progress to have reciprocity between states. To insure fairly satisfactory results from such arrangements, there should be some similarity of standards of examinations.

It has been suggested that there be a national examining board, but this is objected to as infringing upon the rights of the state, but some such arrangement seems highly desirable. Would it not be possible to have a committee of the American Veterinary Medical Association prepare sets of questions, say twenty or more on each subject, and submit these to the various state examining boards that they might select from among these fairly representative questions those the state board liked best?

This would be a step only towards uniformity. There still remains the great factor of grading the answers submitted by the candidates, and this variation will be as great as the number of individuals marking the papers. There is great need of some sort of uniformity, and any step will be progress from the present chaotic condition.

EIGHTY-SECOND COMMENCEMENT EXERCISES—NEW YORK UNIVERSITY.—On June 10th, the commencement exercises of New York University will be held in the auditorium at University Heights. All alumni are extended a cordial invitation to be present. Veterinary alumni attending the alumni meeting at 141 West 54th street in the middle of the day will be able to reach the campus easily in time for the commencement exercises.

REPORTS OF CASES.

SIX EXPERIMENTAL CASES OF TETANUS IN CARNIVORA.

By S. S. N. Walsh, D.V.M., St. Louis, Mo.

The object of the following experiments was not to determine the symptomatology of tetanus in the dog or cat, but to determine the effect of a certain line of treatment. These animals were used as controls. The cultures injected were highly toxic and the bacilli were not removed by filtration, the object being to produce the disease as rapidly as possible, with the toxin formed in vitro and to allow the injected organism to reinforce this action with toxin formed in corpore. Taking into consideration the relative immunity of carnivora for tetanus, due to combination of bacteriocidal and phagocytic action, the symptoms produced in these three animals were likely caused entirely by the toxin formed in vitro.

Behring and several other authors consulted, state that the muscles in tetanus are very sensitive. None of these animals showed any pain on palpation even when considerable pressure was put upon the tetanized muscles.

Trismus was not marked in any of these animals, the symptoms were those of the so-called "*tetanus ascendens*" which is the usual type when the disease is produced by inoculation.

Muller and Glass state that in tetanus of the dog there is a rather constant loss of voice; this dog could bark at any and all stages of the disease. The voice of one of the cats was not affected, but that of the other was lost. A short resume of facts about tetanus toxin may be of interest. A bacterial toxin—exotoxin may be defined as a soluble-diffusable, secretory anabolic, thermolabile product of bacterial activity except (true toxins not bacterial), etc., which when injected or otherwise parenterally introduced into a suitable animal call fourth their antibody, *i. e.*, antitoxin. Easily destroyed by light chemicals, etc. Specific in action and never act without an incubation period. It is precipitated by ammonium sulphate. The purest product which has been obtained by precipitation is in the form of fine, yellow flakes which are soluble in water and insoluble in alcohol, and either do not give protein reactions.

Tetanus toxin on standing loses its toxicity, but does not lose its combining power for antitoxin, showing that its toxo-

phore group has been lost, while the haptophore group still remains intact, toxin minus its toxophore group is designated by Erlich toxoid.

An injection of toxoid followed by a lethal dose of toxin produces no symptoms. Twenty-four hours after an injection of toxoid a sublethal dose of toxin is often fatal.

In alligators toxin is neither destroyed nor is it eliminated for some time. Soon after injection it disappears from the blood, but can be demonstrated in the liver and some other organs.

Metschnikoff tried to produce the disease in turtles by elevating the body temperature, but failed. The toxin remained in the blood and no antitoxin was formed. (Demonstrated in blood by its toxicity for white mice.) The photodynamic power of 5 per cent. solution of eosin destroys tetanus toxin in one hour.

It is known generally that tetanus toxin is not the only toxin of the tetanus bacillus which also elaborates tetanolysin. A haemolytic substance which as far as the disease is concerned is of little importance. A protiolytic ferment and acid are also products of the organism.

The following table of Behring may be of interest, showing the relation of the size dose of toxin to the time required for the production of symptoms.

13 Lethal Doses—Symptoms in 36 Hours.
110 Lethal Doses—Symptoms in 24 Hours.
333 Lethal Doses—Symptoms in 20 Hours.
1,300 Lethal Doses—Symptoms in 14 Hours.
3,600 Lethal Doses—Symptoms in 12 Hours.

It is worthy of note that increasing the dose of toxin shortens the incubation period up to a certain point, and past this point the period can not be shortened, *i. e.*, enormous doses always have an incubation period, this appears as if the action might be enzymatic.

Vaughan states that tetanus and diphtheria toxins in themselves are non-poisonous, but that their toxicity is entirely due to enzymatic action, *i. e.*, they split certain protein molecules in the animal body and liberate their poisonous fraction and this fraction produces the symptoms.

Nocard infected three sheep with the tetanus bacilli at the tip of the tail—he introduced the organisms upon splinters. All three sheep were allowed to develop the disease, then the tails of two were amputated close to the rump. *Result.*—All died in

same manner. Spores of B. tetani freed of toxin and aseptically introduced into animals will not produce the disease because of the rapidity with which they are taken up by phogocytes. Spores plus an injury as lactic acid, etc., will produce the disease.

Knorr gives some comparisons of susceptibility of different animals as follows:

One Gm. of horse is destroyed by -x toxin.
One Gm. of goat is destroyed by 2x toxin.
One Gm. of mouse is destroyed by 13x toxin.
One Gm. of rabbit is destroyed by 2,000x toxin.
One Gm. of hen is destroyed by 200,000x toxin.

The great resistance of carnivora for tetanus is common knowledge, but that this resistance is quite likely bacteriocidal

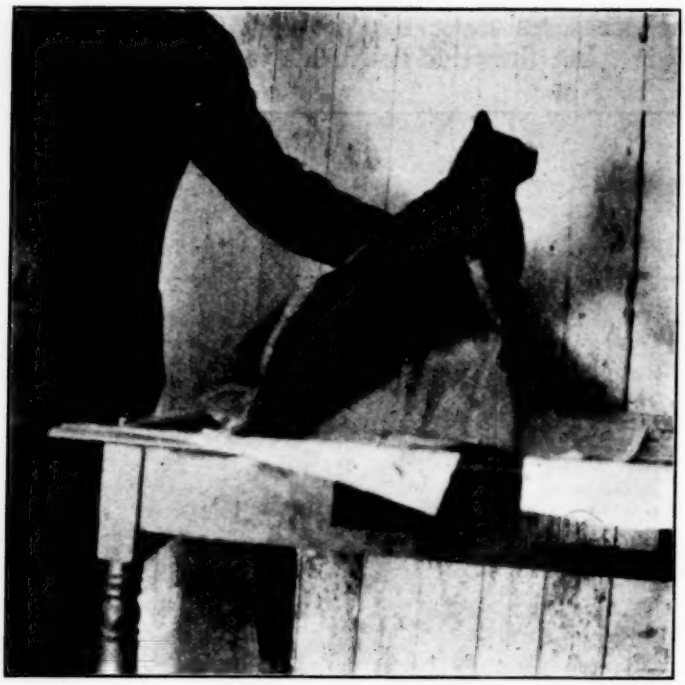
Cat No. I.

and not an immunity which is absolute and protective against both toxin and bacilli are, I think, demonstrated in these three animals.

The inoculation which the dog received would have been without doubt a fatal dose for an herbivorous animal as ox,

horse, sheep or goat and yet it failed to kill this dog—although he had no treatment and no care; he was in a cage with two cats, which were by no means friendly toward him. It is common knowledge as to what the effect of a similar annoyance would be on a horse.

That this resistance is not the same in all carnivora, but varies with the individual, is shown in the cats. In *Cat Number One:* The first symptoms appeared in approximately ninety-two hours; in ninety-eight hours more or in all 100 hours (these figures are rough, but close enough to serve the purpose) the animal was

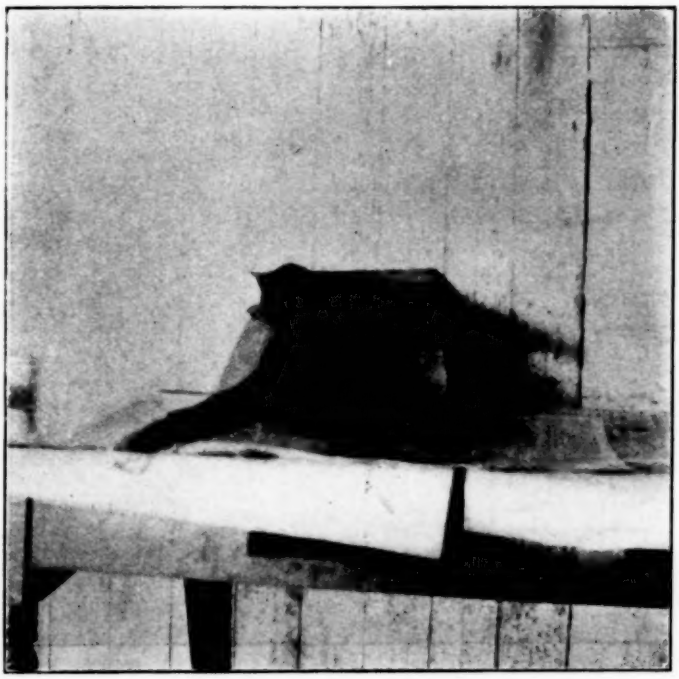


Cat No. I.

moribund—according to the table of Behring, he had in his system between five and ten times more toxin than would have been required to kill him. Now a striking difference is seen in *Cat Number Two:* This animal showed symptoms at the same time after injection as number one. Seventy-two hours after this, or 120 hours after injection, he was by no means moribund. I greatly regret that I killed the animal at this time, as from his general appearance I believe he would have gone on to recov-

ery. In case number one there is no doubt absolutely but that he would have died of asphyxia during the night had he not been killed.

Judging from these three animals, if one may draw any conclusion from so insignificant a number, I would say that the immunity of carnivora against natural infection with tetanus is purely a bacteriocidal one, and that these animals are no more resistant against the action of the toxin than other animals. This is in accord with the resistance or inherited immunity of the



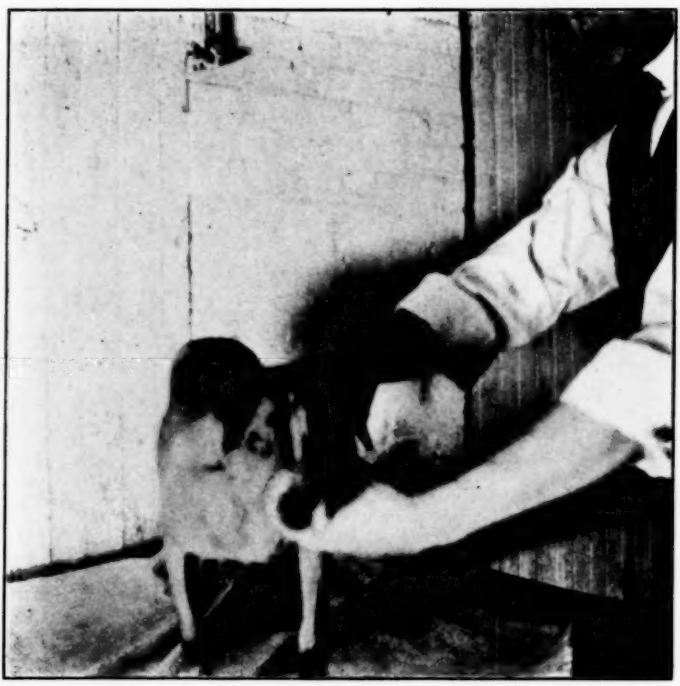
Cat No. I.—Apparently dead, shows extreme muscular contraction.

dog for most all infectious diseases, the same probably acquired by his forefather, the jackal.

For generations carnivora (wild) have preyed upon each other and eaten of cadavers, dead of various diseases, so that an inherent resistance to most infections has become a part of them; it is a common observation that domestication is causing them to progressively lose this; for example, the common cur who rustles his living from garbage heaps is ever so much more resistant to infection than is the pet house dog.

I think that even these few experiments clearly demonstrate that the immunity of carnivora for tetanus is in no manner similar to that which is possessed by the alligator and turtle.

The why of the immunity of the alligator and turtle? I will not attempt to explain; cold-blooded animals are not all immune, as the disease can be produced in frogs if their temperature is raised to 37.5 degrees C. A frog which I injected died with tetanic symptoms—whether or not these were due to



Dog No. I.—Taken when tetanus was general.

the surroundings I will not say. (He was put in a jar of water in a small incubator.)

In frogs kept at 20 degrees C., large doses of toxin are without effect; if later the temperature is raised, death occurs. Morgewroth concludes from this that the haptophore group only combines with the nervous system at 20 degrees C., and that at 37.5 degrees C. the toxophore groups unite. That is, the combination of nerve and haptophore does not prevent later addition of toxophore to the combination.

The results obtained on cats numbers 3 and 4, further substantiate the theory that in the previous animals the symptoms produced were due to the toxin injected and not to that formed in the body. Conclusions drawn from so small amount of data are unquestionably insignificant and a source of error; but as far as these two animals are concerned, it clearly demonstrates that injections of bacilli or cultures which contain no active toxin, are unable to produce any noticeable disturbance.

Dog No. II.

Another point which may be absolutely an error, is the fact that after injection of these cats with a broth culture which had been heated to 56 degrees C. for one-half hour, a subsequent injection of more than a lethal dose of toxin was without effect. I say this may be an error because I unfortunately did not control this injection with injection of a white mouse to at least roughly determine the toxicity of the injected material.

Dog number two showed several marked differences from any of the other animals. In the first place he showed evidence of great pain which seemed to be spasmodic in character.

The symptoms came on more gradually and seemed to slowly extend from muscle to muscle. The others where the site of injection was in the thigh in the vicinity of the sciatic nerve, would show symptoms suddenly, and these were in every case confined to the leg infected, at the onset.

In dog number two, the first evidence of the disease was a lateral deviation of the tail toward the injected side; this very gradually and regularly progressed until there was curvature of the entire spine, the convexity was toward non-infected, *i. e.*, the left side.

During the paroxysm of pain it seemed to afford the animal considerable relief to lie upon the left side. This animal was more responsive to stimuli than any of the others and taking of flashlight picture caused general convulsion each time it was done (three times). Neither of other two animals responded to this form of stimulus.

During etherization, in no case in others, was there anything near complete relaxation of all muscles which had been involved; there was in each a relaxation of some muscles, but the extensor muscles of hind legs never approached even normal tonus, much less complete relaxation.

On poisoning dog number two with strychnine, it was found that at intervals between the convulsions there was complete relaxation of all muscles, including the extensor muscles of hind legs. I mention injection of strychnine merely as a matter of possible interest and not because of any particular significance which it may have.

It is generally concluded that the seat of action or better the cells stimulated or paths opened up by tetanus toxin and strychnine are the same. I wished to determine whether these cells already being acted upon by tetanus toxin could also respond to strychnine in a normal manner, which in this case they did. Although being stimulated to the apparent maximum by tetanus toxin, there was still power to respond to the strychnine.

Dog Number One: Puppy, female (breed, common; age, 5 months); general condition, good.

Culture Used: Five-day-old in lactose peptone broth—this culture (2 m.) killed a white rat with tetanic symptoms in twenty-four hours.

Injection: Jan. 7, 1914; injected M. 5 right thigh in region of sciatic nerve. Jan. 8, 1914: Normal, chases ball, playful, etc. Jan. 9, 1914: Extension and tetanus of the muscles of injected leg. Jan. 10, 1914: Tumefaction (slight) in groin on right

side; this extends down into the inner aspect of thigh, is not painful on palpation, the leg is in extreme extension and cannot be forcibly flexed. (No general symptoms.) Jan. 11 and 12, 1914: Rather close observation revealed no appreciable change, no malaise, appetite good, etc., right hind leg rigid, no exaggerated reflexes. Jan. 14: Observation at about 11 a. m. showed general tetanus (this came on within 12 to 14 hours); ears hang over face, corners of mouth retracted, very marked corrugation of forehead; emits a smacking noise at the sight of food; appetite is good and is able to swallow solids.

Movement of jaws are not much influenced—general muscular rigidity. Palpation of any portion of body causes no pain. Marked oedema of leg into which injection was made seen mostly below the hock. While the symptoms were general was never observed lying down.

Slight elevation of the head causes exaggeration of the muscular contractions about the head and the animal falls; a slight push also causes a fall.

There is marked fixation of eyeballs, will bark at strange sounds.

Jan. 14 to Jan. 22, 1914: Not much change; appetite good; some emaciation and atrophy of muscles of injected leg. On about the 14th three flashlight pictures were taken, none of the flashes causing any convulsions in the animal, and at this time a slight tap would produce the well-known general muscular contractions seen in strychnine poisoning and tetanus; why these did not occur with the optic nerve the apparent path I will not attempt to explain.

Jan. 25, 1914: Muscles of fore limbs and retracters of mouth are beginning to relax.

At no time since Jan. 7, 1914, has even forced flexion of infected leg been possible.

The same remaining in a state of rigid extension.

Jan. 26, 1914: Much harder push than that required to cause a fall a few days ago causes no fall. Elevation of head no fall.

Dog Number One: Jan. 28, 1914: General muscular contractions rapidly subsiding. Except infected leg where atrophy is progressive and there is rigid extension. Jan. 31, 1914: General symptoms entirely subsided. Infected leg rigid extension. Feb. 12, 1914: Dog normal, except absolute rigidity of the leg injected, the same in state of extension; forced flexion impossible.

Three weeks before this dog was used for this experiment

a spinal puncture was made (lumbar region) and two or three drops of fluid withdrawn.

No fluid could be withdrawn while the animal was in state of general tetanus (this was not because of bad technique). This fact is mentioned only because it was done, because it probably has no significance whatever; because this same phenomenon is often observed in the normal dog.

March 21, 1914: In last month there has been a proliferative arthritis of the stifle with exostosis about the tibia near the joint; this has resulted in more or less ankylosis of the joint.

The leg is still in state of extreme extension and cannot be flexed; exactly how much of this is now due to the arthritis I am unable to say.

April 8, 1914: Leg is slowly relaxing and animal is beginning to use it; the arthritis has subsided.

Dog Number Two: Animal, male cur; mouse color; weight, 30 pounds; general condition good.

Culture Used: Four-day-old culture of B. tetani in beef infusion peptone broth. *Injection:* March 9, 1914, at 10 p. m. injected two drachms of above culture into muscles of lumbar region on right side of vertebrae. March 10, 1914: No symptoms. March 11, 1914: No symptoms. March 12, 1914: Observed at 1 p. m. showed slight tendency to carry rump to right side, *i. e.,* back curved convexity to the left. Movements of right hind leg slightly restrained. Observation on night of 12th shows slight stiffness of both hind legs. Deviation of tail to right—this is marked; the stiffness of the legs is so slight that a casual observation would detect nothing.

March 13, 1914: Marked deviation of tail to the right; the same is not elevated and remains a little below the horizontal position. Scoliosis with convexity to the left; no tenderness over muscles affected. Animal is in great pain; whines, lies down and looks at lumbar region (no inflammation); locomotion is appreciably affected. Muscles of hind legs tense, more especially the extensors; the legs appear bowed. Pain seems to be paroxysmal and shows desire to lie on side during paroxysm and when observed always lies upon convex side. More or less constant erection of penis.

March 14, 1914: No marked change; slight increase in contraction of affected muscles, and there seems to be gradual involvement of a few more muscles as if the contractions spread by continuity.

March 15, 1914: Mild general tetanus; gait is tilty. Eye has characteristic appearance. Motion of jaws is impaired; can open mouth wide, but to do so seems to be quite an effort.

March 16, 1914: Has almost constant erection of penis. Some retractions of the corners of mouth. Is exceedingly responsive to slight stimuli and easily goes into general convulsions. Taking of flashlight picture on this date caused general muscular spasms.

March 16, 1914: The following may be of interest because of similarity of action of tetanus toxin and strychnine: 9.48 p. m. given subcutaneously strychnine sulphate ¾ gr.; 9.50 was in death spasm which came on in same manner as in horses destroyed by intravenous injections of strychnine; artificial respiration was resorted to; 10 p. m. died; 10.35 p. m. marked rigor mortis.

Just before death there was general muscular relaxation, which also took place between convulsions. This was never complete (relaxation) in animals which had tetanus and were under the influence of ether. Autopsy showed nothing but lesions of death from asphyxia.

Cat Number One: Cat, male, adult; general condition good.

Culture Used: Seven-day-old culture of B. tetani in meat infusion peptone broth.

Injection: Jan. 25, 1914, 10 m. injected into left thigh in region sciatic nerve. Jan. 26, 1914: General appearance normal; jumps normally; refuses food. Jan. 27, 1914: Injected leg extended and rigid. Jan. 28, 1914: Eyes fixed (ears erect); tail erect; lies on sternum with legs extended. Any sudden sound or slight stimulus causes general spasms.

Jan. 29, 1914: General tetanus; opisthotonus; tail erect; legs extended; lies on side, unable to rise or cry; respiration shallow; heart, rapid; pupils react to light; mouth half open, tongue protruded; extension of legs so extreme that volor surfaces of feet cannot be made to touch ground when animal is in standing posture.

Any slight stimulus (touch, noise, etc.) causes general convulsions.

Three flashlight pictures taken and none of the flashes caused the slightest movement of the animal (his eyes were open).

Spinal puncture result no fluid. Post-mortem section of cord no fluid detected.

On night of 29th attempt to etherize resulted in death after three or four inhalations (50 per cent. air) sudden extreme

dyspnoea; mucus appeared in nose and mouth; apnoea; syncope attempts at resuscitation gave no results. This animal was practically moribund at time of etherization.

Post Mortem: Immediately after death there was relaxation of muscles of front legs, neck and tail.

The hind legs remained rigid for one hour when observations were discontinued.

Cat Number Two: Male cat, large adult; condition good. *Culture Used:* Same as for number one, except the tube containing the broth had been exposed to light and under aerobic conditions for twenty-four hours. *Injection:* Jan. 26, 1914, 15 m. injected into thigh, in region of sciatic nerve. Jan. 27, 1914: Normal. Jan. 28, 1914: Morning, injected leg flexed, and movements are difficult; night, leg extended rigid; no general symptoms. Jan. 30, 1914: Shows difficulty in masticating solid food; stroking back causes usual rising of same and tail with synchronous purring. Injected leg rigid extension. Jan. 31, 1914: Unable to rise; hind legs extended; motion of forelegs limited; is very nervous and apprehensive; cries a great deal; jumps at any sudden sound or slight stimulus.

Etherization on night of 31st; was under in less than one minute and during this period struggled very violently. All muscles relaxed, except crural and muscles of ham in both hind legs which, although in not as high a state of contraction as before etherization, they still maintained a much greater tension than normal muscle tonus. Spinal puncture, no fluid.

Etherization continued until death; on dissection of the lumbar cord no fluid was seen.

Large percentages of normal cats and dogs give so-called "dry tap." So above has absolutely no significance as far as the negativity of fluid present is concerned.

Cat Number Three: Half-grown female grey-and-white cat; poorly nourished.

Culture Used: The same tube as was used on dog number one, the same having stood exposed to light since that time (*i. e.*, since Jan. 8, 1914). This was heated before injection to 56 degrees C. for one-half hour. Control culture from this showed many bacilli.

Injection: March 14, 1914: Injected seven minims into muscles of thigh. Showed no symptoms, except a transient stiffness of the leg, which appeared on March 16, 1914, and disappeared in twenty-four hours.

March 16, 1914: The figures to follow are unfortunately

indefinite, as I was confident that I was about to inject enough toxin to kill these cats. B. tetani was grown in 350 c.c. of broth for ten days; the toxin from this was precipitated by means of ammonium sulphate and then dissolved in about 10 c.c. of water; 1.5 c.c. of this solution was injected into the left thigh of this cat in region of sciatic nerve.

It is equally unfortunate that no control on the potency of this toxin was made, as it was destroyed in the autoclave after injection.

To date (*i. e.*, March 21, 1914) this cat has shown no symptoms. The culture was not filtered before precipitation with ammonium sulphate.

March 29, 1914: No symptoms from any bacilli that might have been in the ammonium sulphate precipitation.

Cat Number Four: Animal, half grown, poorly nourished, male cat. *Culture Used:* Same as for cat number three. *Injection:* March 4, 1914: Injection made into muscles and subcutaneous tissue of back. March 16, 1914: No symptoms; was injected with 1.5 c.c. of same solution of toxin as number three. March 21, 1914: Has shown no symptoms.

March 29, 1914: Has shown no symptoms; any that *might* have developed at so late a period would have been due to bacilli in the toxin, as I mentioned already that the culture was precipitated without filtration.

NYMPHOMANIA IN MARE—OOPHORECTOMY FOLLOWED BY RECOVERY—RETURN OF CONDITION AFTER YEAR'S TIME.

By Robert W. Ellis, New York, N. Y.

The subject, a black coach mare suffering from nymphomania, had become so bad a kicker when in harness as to render her dangerous and entirely useless, and she had become very much run down in flesh. Her ovaries, which proved to be cystic, were removed on April 14, 1913; the operation being followed by a rapid restoration to a normal condition, driving nicely single or double, and a return of her former physical condition. In fact, three months after the operation, while working everyday, she carried more flesh than she had carried at any previous time. This satisfactory state of affairs continued until thirteen months

after the date of the operation, when she suddenly showed marked symptoms of estrum, which increased in intensity, and her vicious kicking propensity returned with it. I was naturally very much disappointed, and also somewhat at a loss to account for it, as I believed that with my patient unsexed the estral function and especially the nymphomania and kicking habit, had been eliminated. The facts that relief had followed the operation and continued for thirteen months made the return of this condition especialy hard to account for, to my client, and incidentally to myself.

Dr. H. Fulstow, Norwalk, Ohio, in a paper presented to the American Veterinary Medical Association at Toronto in 1911, and published in the AMERICAN VETERINARY REVIEW of February, 1912 (page 651), puts his subjects into three classes as follows:

"1. Mares that are mean when in heat only, and those that are continuously in heat but do not kick, will be cured by ovariectomy.

"2. Some mares that kick nearly all the time, whether in heat or not, will be cured by the operation. Some others will be benefited, and in some few cases it will do no good.

"3. Old mares that have kicked for years and have contracted the habit, and those that kick all the time when not in heat, but when in heat are gentle, the operation will not benefit at all."

Unfortunately I am not in a position to state with any degree of accuracy in which one of the first two classes my patient belongs, as I do not know whether or not she was continuously in heat or kicked when not in heat before the operation, but only know from the history given that she always kicked in harness under the slightest provocation, such as some part of the harness touching her when brought to a stop after driving. I feel certain she was not in class 3, because the condition had only existed a few months when my attention was called to her, and she was operated upon almost directly afterward. I incline to the belief that she belongs in class 1, because of the fact of her showing symptoms of estrum and the kicking propensity simultaneously in this present relapse. Perhaps Brother Fulstow or some other gentleman who has had experience with this condition and the operative procedure for its relief, will throw some light on my case. Why should the estral function return in a castrated female after being absent thirteen months? Will the removal of the clitoris be of any advantage in this case?

IMPACTION OF THE LARGE INTESTINES.

By W. D. Forsythe, V.S., North Toronto, Ont., Canada.

Having read in different journals many of the forms of treatment for the above mentioned condition, and having treated a great number successfully, I will outline my method, which is as follows: After examining the patient and feeling certain that you have a case of obstruction, give 10 drs. of Barbadoes aloes, pure, that is, to a large horse; then give 1 grain of arecoline and ½ grain of strychnia sulph. Never give more than 1 grain of arecoline at once to any animal; large doses act too severely. I have never used arecoline closer than 30 to 45 minutes between doses. Then give the animal a clyster; endeavor to get the hose inserted well up in bowels, using a stiff hose. I am never afraid of injecting a heavy horse with arecoline when I use the strychnine with it. Do not tap these cases on seeing that they are not coming your way, if you do you will get very little gas.

I am pleased on reading literature, that arecoline is contra-indicated in gastric fermentation. In times gone by I have read so much about it being so serviceable in such cases, but believe that I have killed a few with it, so now I carefully pick my cases. It no doubt should be used cautiously in aged animals; don't like it in cattle practise. Of course, with our typical animal I order walking exercise. By the way, I consider it a waste of time and medicine and a great annoyance to an animal suffering with this disease to drench him at any time with bulky medicines or whiskey. Don't use it; don't mask the symptoms; and as long as you can spend time with your animal, watch him, never use anodynes of any kind, so long as you are looking for good results, I will admit much in this article is old, but it should help some new graduate, and there will be many just at this season.

HOOK WORM DISEASE IN A MULE.

By R. A. Stoute, D.V.S., Government Veterinary Surgeon, Barbadoes, West Indies.

Subject—Gray gelding mule 5 to 6 years old.

History—Imported from Argentina, South America, some months ago.

When purchased the animal was in first-class order and appeared in perfect health. After it was in the Island for a short time it began to lose condition.

Symptoms and Treatment—These I am unable to give, as I did not see the animal.

Post Mortem—My partner, W. H. Thorpe, was visiting the farm when the mule died and found the following conditions: All the organs seemed healthy, although aenimic; blood very thin and watery. Peretonium was covered with fat about half inch in thickness.

Stomach—Contained no worms.

Intestines—The feces in the entire intestinal canal was simply crowded with worms. A tobacco tin of the contents of intestines was brought me in which was found a crowd of "*hook worms*" and a number of "*strongyloides intestinates.*"

Microscopical examination of feces was made by the Government bacteriologist and myself and quite a number of eggs of the hook worms were found.

One naturally asks, to what extent would a case of this kind cause the spread of the disease among humans?

ABSENCE OF LEFT KIDNEY IN DOG.

By Robert W. Ellis, New York, N. Y.

Young French bull dog having died in an epileptic fit was autopsied in search of intestinal parasites as a possible cause of the malady. After removing the entire digestive tube (in which, by the way, our search brought negative results), we took out all of the other organs for inspection, which finally brought us to the kidneys. The right kidney was removed and weighed 40 grammes (1 1/3 drachms), but there was no trace of the left one. The dog was about a year old, and had been my patient when three months old with distemper, at which time he was very much emaciated, but finally filled out and had been a healthy, normal dog up to the time of the sudden appearance of the epileptic fit which resulted in his death.

Automobile Claims Another Veterinarian a Victim.—Dr. Lee Underwood, graduate of the McKillip Veterinary College, practising at Tomah, Wis., was the victim of an automobile accident in March, by his machine turning turtle. He was struck on the head by the overturning of the car, causing a fracture of the skull. He died without regaining consciousness.

ABSTRACTS FROM EXCHANGES.

ENGLISH REVIEW.

By Prof. A. Liautard, M.D., V.M.

Impaction of the Oesophagus [*C. W. Cartwright, M.R.C.V.S.*].—Case of a three-year-old cart mare which, whilst able to swallow, presented symptoms leaving no doubt as to the nature of her trouble. Food would pass the pharynx, but stopped below the parotid, where was a swelling, doughy to the feel. The mare had profuse salivation, roared, had gulping movements and dirty, food-stained discharge from the nostrils. By proper treatment of fomentations, massage, belladona electuary, the animal recovered. However, after some time, the same condition returned and did so several times, when finally the mare's condition grew so critical that operation was decided. With great difficulties and several attempts the oesophagus, after being exposed, was cleaned out of its packing, which extended from the mouth down to the stomach. For some time the mare was fed with rubber tube, but finally the wound healed and recovery was perfect, the animal having regained her condition was able to work. Her recovery was only temporary. After a comparative short time she again had a series of her troubles, until a last one carried her away. Unfortunately no post mortem was made.—(*Vet. News.*)

Ovarian Cyst in a Mare, Spontaneously Discharges; Recovery Follows [*W. Cargill Patrick, F.R.C.V.S.*].—A thoroughbred mare is taken from the turf and sent to the stud. She is not a success. Examination of her generative organs shows nothing particular except a slight difference in the size of the ovaries. Artificial impregnation is followed by good results and she has a foal. Twenty-four hours after she has colic, weak pulse, accelerated breathing, and a temperature of 103 degrees F. Rectal examination revealed her right ovary much enlarged and cystic. Sedatives relieved her. Interference with the ovarian cyst being postponed until foal is weaned. The mare is left alone, but several months after is taken up and on examination the ovary, which was so large before, is now shrunken and adherent to the brim of the pelvis. The report was that one

morning she was found while at grass with a wound close to the udder, from which there was an abundant discharge which lasted several days. The mare had then improved much in condition. She was returned to the Stud.—(*Vet. News.*)

RUPTURED UTERUS IN A SOW [*W. T. D. Broad, M.R.C.V.S.*].—Pedigree sow is farrowing. She has passed a dead pig already with some difficulty. Another is taken away and she is left, being watched. Two hours after a third pig is born. This one is alive and strong. The sow passed all her cleanings, which seemed to form quite a big mass for only three pigs. The animal is quiet, takes her food and walks about. Two days after she dies suddenly.

Post Mortem—Blood, tinged fluid in quantity in the abdomen. With the intestines three pigs without foetal membranes and a fourth lying in contact with the right lobe of the liver. The uterus had a large hole on the under surface and contained a very small portion of foetal membranes.—(*Vet. Record.*)

ABDOMINAL NEOPLASM [*Arthur N. Foster, F.R.C.V.S.*].—Concise record of a terrier bitch which two months after giving birth to a litter of three puppies had her abdomen enlarged considerably. Abdominal growth was diagnosed. The bitch was destroyed. There were scattered through the abdomen multiple growths, one of which weighed over 4 pounds. The others, about 20 in number, varied in size from that of a marble to that of an orange. They were myxomata.—(*Vet. News.*)

UNIQUE ACCIDENT TO A HORSE [*Prof. Edmund Burke, D.V.M., Lahora, India*].—The photo that illustrates this report shows the very peculiar aspect of the injury which was received by a six-year-old mare while out for a ride by the owner. Suddenly frightened by a motor car, the mare made a jump, severely knocking the fetlock of the near hind leg and became very lame. She could walk only on three legs, with the injured one flexed and the digital region hanging loosely below. The lower extremity of the large metatarsal bone protruded through a wound in front of the joint. The skin was widely torn, the tendon of the extensor pedis was ruptured and the anterior and lateral ligaments of the joint stripped from the distal extremity of the large metatarsal bone. The injury was probably the result of severe knocking of the fetlock, as there were no abrasions or

other sign of having been knocked against any hard object.—(*Vet. Journ.*)

SOME CLINICAL CASES [*W. R. Davis, M.R.C.V.S.*].—Under this heading the author describes the three concise reports:

1. *Amateur Surgery.* That of a cow which, having tympanitis has been operated by her owner, who made a puncture of the paunch with a pocket-knife and introduced in the hole "a cigarette holder." This had gone between the skin and rumen and the gases escaping through the slit had gven rise to sub-cutaneous emphysema extending from the poll to the buttocks of the cow. A proper puncture was then made by the writer, the canula of the trocar left in place and the next day the cow was chewing her cud. It took several days for the sub-cutaneous emphysema to pass away.

2. *Distension of Urinary Bladder in a Cat.* One day the cat is ill, refuses food, vomits and has her bladder greatly distended. It is tapped in front of the pubis, a pint of reddish urine is removed. Two days after the cat goes home. Six weeks later same condition returns with same treatment and results. A third interference was also required. What was the cause could not be made out—owner refusing laparotomy to be performed.

3. *Snoring in Cows.* A cow roars very loudly. She had to be tracheotomized to be relieved, a permanent tube was introduced. Three months later she is sold to a butcher. The larynx, a part of the trachea with tube in place are sent to the writer, who finds the mucous membrane replaced by granulation tissue with caseating patches. Vocal cords have disappeared. Arytenoid cartilages were enormous and affected with amyloid degeneration. One laryngeal lymph gland was tuberculous. —(*Vet. News.*)

MITRAL DISEASE IN THE HORSE [*Horace L. Roberts, F.R.C.V.S.*].—Records of the history of three cases of mitral disease, manifestations, observed in a five-year-old gelding, in another rising four and a third in a six-year-old pedigree Shire mare. The symptoms are described and the successful treatment given consisted in the administration of strophanthus, which, the author says, "in conjunction with good hygiene and abundance of fresh air seems to be preferable to digitalis, whose long repeated doses might have an injurious effect upon an already weakened system.—(*Vet. News.*)

TREATMENT OF CONTAGIOUS ABORTION WITH "BISSULIN" [*E. C. Winter, F.R.C.V.S.*].—This bissulin is a non-irritant, germicide and antacid compound made up of different fats and containing 25 per cent. of strong sozojodol mercury. It has been used by the writer in several instances and is highly recommended by him and others in cases of outbreaks of contagious abortion. Three special cases are reported. In a herd of 22 cows, where 12 have aborted, the treatment was begun and within twenty-four hours the disease stopped. In a second, there were 18 cows, six have aborted, seventeen received the treatment. The last one did not get it and aborted, the others were saved. In a third case, out of 30 cows where ten had aborted. The disease was there brought in by a diseased bull. The author tried bissulin also in mares that had vaginitis and obtained very good results.—(*Vet. Record.*)

FATTY DEGENERATION OF THE KIDNEYS IN CAT [*E. Wallis Hoare, F.R.C.V.S.*].—Three-year-old Persian cat has the following history. Had persistent diarrhoea, which was checked and recurred. Appetite capricious. Constipation, vomiting and thirst. Emaciation proceeded very rapidly. On palpation kidneys feel enlarged, specially the right. Micturition involuntary. Staggering walk. Animal is destroyed. Post mortem showed lesions of acute enteritis. Kidneys are enlarged, of deep yellow color, as if bile-stained. Their surface was smooth and covered with numerous dilated veins. Fatty degeneration is plainly observed in sections which were anemic and unctuous. No macroscopic distinction between the cortical and medullary portion can be observed. Large mass of fat surrounded them. The author asks, was the enteritis primary or secondary? Or was it a case of slow phosphorus poisoning?—(*Vet. News.*)

FRENCH REVIEW.

By Prof. A. LIAUTARD, M.D., V.M.

RECTAL AND INTESTINAL COPROSTASIS IN DOGS [*D. Bonnigal*].—Quite frequent in old subjects it is easily recognized and generally relieved by oily rectal injections and laxative diet. Yet there are exceptional cases.

One small bull, after the rectal evacuation is obtained, reveals yet by abdominal palpation the presence of a hard sub-

stance in the last portion of the colon. The ordinary manipulations with the fingers are not advisable, for fear of laceration. However, by holding the mass steady with the fingers of the left hand, it was possible to introduce a blunt probe and with it break up the obstruction. Enemas of oil completed the cure.

In another, a large dog which has constipation since several days, the rectum is filled with concreted mass, which makes the anus protrude and forms a tumor as big as an egg. The mass was removed after being crushed and the ordinary treatment prescribed. Three days after, another large stercoral mass is in the rectum and extracted. There is still some in the colon. No operation is possible owing to the condition of the dog, which dies on the nineteenth day.

At the post mortem the last portion of the colon was found blocked with a mass measuring 20 centim. in length and 5 in diameter.—(*Presse Vet.*)

Melanotic Tumor of the Shoulder [*L. Rossignol*].—Reported at the *Soc. Veter. Pratique,* the case was that of a light grey stallion, in good condition, which had a swelling on the left shoulder. Astringent lotions relieved him after a few days. The swelling however returned and assumed the characters of cold abscess. Blisters were applied and several points of firing were followed by septic infection, which was controled with tincture of iodine. Improvement took place and the growth began to diminish when an attack of colic killed the horse in a few hours. At the post mortem a general melanosis was found, of which the trouble at the shoulder was but a manifestation. The muscles mastoido-humeralis, posteaspinatus, abductors of the arm were involved and the melanotic neoplasm was lodged under the scapula. In the abdomen, the stomach and large colon were many melanotic tumors of various sizes. There was one in the spleen that weighed 19 kilogs. The liver and the thoracic organs were healthy.—(*Bullet. de la Soc.*)

Sudden Death and Thoracic Exudations in Cat [*MM. Lasserre and Lesbouyries*].—Two new observations are added by the authors to those already recorded.

1. *Tuberculosis Pleurisy.*—One-year-old black cat is sick since a few days. Percussion and auscultation of the chest justify a diagnosis of pleurisy. The temperature is about being taken when the animal struggles violently and suddenly dies. Before making the autopsy the pleuretic exudate is removed

with a trocar. As the cat is open, the lungs, principally the left, are covered with tuberculous deposits. In the abdomen the mesenteric glands are also diseased.

2. *Pyo-Pneumo-Thorax.*—Three-months-old grey cat does not eat since three days. Percussion of the chest reveals double dullness, and ausculation shows on the right side a gurgling noise. Then suddenly, as the examination is continued, the cat dies suddenly. Post mortem: Fluid in both pleural sacs, more abundant on the right, where it is purulent. Left lung is normal, but the right covered with false membranes, which make it adhere to the parietal pleura. There are also few nodules and more abscesses communicating with the pleural sacs. No bacilli of Koch present.—(*Rev. Veter.*)

Mischiefs of Distemper Abscess [*Major Prevost, Army Veter.*].—Four-year-old mare, recently in the ranks, and with history that she has had distemper, passed blood from the anus. Bedding and side bars of the stall are covered with blood. The animal is depressed, with pulse small and imperceptible and visible mucous pale. The genitals are free from excoriation, the brim of the anus covered with blood but having no wounds. Rectal injections bring out hard and blackish balls of manure. Examination of the rectum shows the organ very warm but without indication of traumas. During the same night the mare dies. Opening of the abdomen allows the escape of some reddish serosity. Peritoneum is inflamed. Colic and coecal lymph glands are hypertrophied. Great mesenteric vein is gorged with blood. Mesentery congested. An abscess as big as a child's head is located at the right perirenal region—pressing gradually on the portal vein, which it has pushed aside, and gives rise to a hemorrhage of the large colon on a level with the diaphragmatic curvature. Examination of the pus had shown the streptococcus of Schutz.—(*Bullet. Soc. Centrale.*)

Intoxication by Tobacco Juice [*Major Maire, Army Veter.*].—A horse was reported as dying with colic. He is greatly prostrated, covered with cold sweats; he has muscular shiverings, profuse salivation, accelerated respiration, staggering walk, infiltrated conjunctive, membrana nictitans protruding and pupil largely contracted.

The history of the case was that the horse had been rubbed an hour before with a solution of tobacco juice. Diagnosis is all indicated.

Treatment: Bleeding of 4 kilogs., alcoholic infusion of coffee, sub-cutaneous injection of pilocarpine. Improvement manifested itself two hours after and complete recovery followed the next day.—(*Journ. de Zootechnic.*)

INTESTINAL OBSTRUCTION IN DOG—RECOVERY [*A. Marlot*].—Notwithstanding repeated rectal injections, a dog five years old has obstinate constipation. He refuses all food, has colics, and made unsuccessful efforts to defecate. He is in great prostration, breath fetid, pulse quick and small, there is high fever. Abdomen is painful on pressure, and the presence of an oblong tumor, a little moveable, as big as the fist and hard as a stone is revealed by palpation. An injection of oil is pushed in the rectum and then in the organ is introduced a long, flexible probe, made with a piece of wire which is bent in a loop at one extremity. The bend is six centimeters long and two wide. With this probe the obstruction is gradually broken up and removed piece by piece. Cafeine, castor-oil and enemas completed the recovery.—(*Repertoire Vet.*)

EXTRA-UTERINE GESTATION IN A SOW [*M. Jacquot*].—Sow has four little ones at term and as a consequence of the expulsive efforts has a vaginal and uterine prolapsus. Of the four little pigs, three were alive and one dead. The prolapsus involved the body and horns of the uterus. Reduction was attempted but, on fearing a laceration, amputation was advised and performed in the usual way by an elastic ligature. While the reduction of the stump two living foetus were detected within the abdomen cavity. At that time the sow was in such condition that she was killed for butcher purpose. At the post mortem there were found in the abdomen two sacs of unequal dimesions. The largest contained two foetuses, united by their ventral surface and with only one umbilical cord which divided to go to the ombilic of each foetus. The smallest pouch contained one foetus less developed. The two pouches had their own membranes, they were not adherent to the peritoneal serum, and had a closed connection with the oviducts.—(*Rec. de Med. Vet.*)

ILLINOIS STATE VETERINARY MEDICAL ASSOCIATION. The midsummer meeting of this active veterinary organization will be held at Springfield, July 15.

CORRESPONDENCE.

PITTSBURG, PA., May 13, 1914.

Editor, AMERICAN VETERINARY REVIEW, *New York City:*

Dear Sir—I am enclosing copy of the letter which you asked for in your letter of the 12th inst. This letter was written, as you will notice, the 27th of March. In it I review Dr. Gilyard's method of treating a case of impaction of the caecum, and point out where I think that it is at fault. I also give a supplementary treatment which I think is to be added to the Doctor's treatment if there is to be any hopes of ultimate success.

Since writing the enclosed, the April REVIEW was published, giving a report of a case treated unsuccessfully by Dr. Gilyard, and by a perusal of this case report you will find that he failed at precisely the point that I predicted the treatment would fail, and my letter, which you published last month calls attention to this fact.

Hoping that this letter will serve to clear up my viewpoint, I am Yours very truly,

A. C. WIGHT, D.V.M.

PITTSBURG, PA., March 27, 1914.

Editor, AMERICAN VETERINARY REVIEW, *New York:*

I read with interest Dr. Gilyards paper on Impaction of the caecum, and it has prompted me to make some observations which are, I am afraid, mostly destructive in nature rather than constructive.

To begin with, the walls of the caecum are relatively weak. That is, the walls are not designed to handle heavy masses of food, the normal content which they handle being only a small amount of fluid material. Now let us imagine an impaction as having just occurred. This means that a large amount of ma-

AN EXPLANATION.—The correspondence from Dr. Wight under date of March 27, 1914, was sent us prior to the one published in our May issue, page 247, but in some way failed to reach us. So we published the second letter alone, when it should have been preceded by the letter of March 27, 1914, as Dr. Wight explains in the above letter, under date of May 13, 1914.—[EDITOR.]

terial, about seven or eight gallons, is in the caecum. Efforts are made by the organ to exclude this material. To do this it must elevate at least some of it two or three feet to the base and then eject it through a slit-like opening into the great colon. This it is unable to do—otherwise there would be no impaction. The presence of this material stimulates muscular contractions which, as they persist, become feebler and feebler until there supervenes a condition of stasis in which the muscles are relaxed and flacid. The pressure of the material impedes the circulation, and a passive congestion of the walls takes place. This all means that there has been a loss of *tonus* of the muscle. Now, one of the main things essential to muscular contraction is *tonus*. Without it nerve stimulation would not produce contraction any more than opening the throttle of a "cold" locomotive could cause it to move.

This all simplified means to me that we have an equation of pressure = loss of *tonus* + passive congestion, or, in other words, loss of function. Therefore, to solve the equation we have to solve for pressure, and then that will be the cure, but any treatment which does not as its first essential remove pressure and remove it permanently, is foredoomed to failure.

Drugs which stimulate peristalsis can give no relief, as we are dealing with an organ already stimulated to the limit of its ability to respond. Food material from the small intestines cannot be forced against this mass in an effort to make it move, as the food lies in a giant cul-de-sac, and the other material passes directly from one valve to the other, a matter of only about two inches.

Drugs which cause a large amount of fluid to be thrown into the bowels, causing the contents to become very liquid, can have no effect as the fluid passes from one valve to the other as before stated. In one case we had, there was a very fluid diarrhoea during the whole course of the disease.

Mechanical means remain to be considered. Let us apply the method proposed by Dr. Gilyard, and endeavor to remove the contents by filling the whole bowel cavity with water. The caecum is already filled to capacity, so very little water would pass into it, but the largest part would cause a slight disturbance at the free part between the two valves, perhaps removing the soluble material at that point, but not touching the great amount of insoluble material lying below.

Let us give this method up and insert a trocar, and then at-

tach a tube and pump and by this method remove the obstruction if possible. Granting that this has been done, we still find the caecum filled—this time with water. Our old bug-a-boo, the pressure, is still with us, and as our equation we still have atony and loss of function with us.

At this time it is best that we refer to an analogous condition in the ox, atony of the fore stomach. Referring to the accepted treatment of this condition by means of the trocar we find that the ox, or usually it is a calf, is laid on its side and the water which has filled the stomach is allowed to run out through the trocar, or the fore stomach is massaged until most of the water has entered the other compartments. Thus it is seen that the pressure, present here and doing the damage as in the horse, is removed, and this allows the return of the circulation to normal and allows the muscular wall to regain their *tonus*. The refilling of the stomach is easily prevented by refusing food or drink until the stomach is capable of again handling it normally.

Referring again to the horse, we see that our work is useless unless we devise some means of removing the water from the caecum, and keeping it empty, or nearly so, until the walls of the organ regain their normal condition, which would be a matter of days, to say the least. This might possibly be done in a very small animal in thin flesh by turning him on his back and kneading the abdomen thoroughly several times a day. In a large animal in good flesh some venturesome spirit might try inserting a trocar into the apex of the caecum and thus removing the fluid. The trouble with the horse is that we cannot so easily control what passes into the organ from the time we once get it empty until it can handle material itself, as we can in the ox, as the vast length of the small intestines will drain into this flabby sac and fill it right up again. In the ox, if the animal does not eat, nothing at all gets into the fore stomach.

As a resume, I would suggest as a treatment that the caecum be emptied by means of the trocar, if possible, and then all the water be drawn off, either by massage or by tapping through the ventral surface of the abdomen, and that in conjunction with this that a drug be given which will reduce intestinal secretions to a minimum for at least 48 hours, after which the usual intestinal stimulents be used. If the animal does not die of the impaction itself the treatment may kill him, but I cannot see any other method by which there can be promised any relief from the pressure on the walls of the organ and the attending disasterous sequelae.

Yours very truly,

A. C. WRIGHT, D.V.M.

GREENVILLE, MISS., May 12, 1914.

The AMERICAN VETERINARY REVIEW, *New York, N. Y.:*

DEAR SIRS—There was held at Jackson, Miss., on May 11, 1914, the most successful and interesting veterinary meeting that was ever held in this state. Over forty (40) members were present, and twelve (12) new members were elected to membership in the association. Three members were elected to the first State Veterinary Examining Board of Mississippi. The election of officers of the association for the coming year were as follows: Dr. J. A. Beavers, of Canton, president; Dr. W. L. Gates, of Clarkesdale, vice-president; Dr. J. D. Townsend, of Louisville, secretary and treasurer; Drs. John Oliver, W. R. Edwards and O. M. Norton, executive committee.

The newly elected Board of Veterinary Examiners met and selected Dr. O. M. Norton, of Greenville, as president; Dr. James Lewis, of Greenwood, vice-president; Dr. W. P. Ferguson, of Grenada, secretary and treasurer. A regular meeting of the board for the examination of candidates for the practice of veterinary medicine and dentistry will be held at Jackson, Miss., on June 19, 1914.

Yours truly,

O. M. NORTON.

Albany, N. Y., April 30, 1914.

Editors, AMERICAN VETERINARY REVIEW, *New York City:*

A couple of rather unusual instances in connection with breeding animals have come to my notice, which I thought might be of interest to breeders and stockmen, and will be glad to have you give them space in your valuable journal.

When visiting the Haggins Farms at Lexington, Ky., last fall, I saw that beautiful Jersey sire, "Noble of Oakland," age 6 years, and learned from the records that this bull had 460 *successful services* to his credit during the season of 1912.

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* *

When attending the New York State Breeders' Association meeting, February 5, 1914, I met Mr. Darien Rumsey, of Tompkins County, N. Y., and he advised me that he had a pure bred Percheron mare that had then dropped 2 foals and 5 fillies, all

of which are living normal animals, and that the mother is again bred, the service appearing to be successful. This mare was 9 years old April 15, 1914.

Very truly yours,

J. F. DEVINE.

Tyler, Minn., May 9, 1914.

Editors, AMERICAN VETERINARY REVIEW, *New York:*

I am a subscriber to " Maanedsskrift for Dyrlager," a Danish semi-monthly veterinary paper, and the following report for the year 1911 may be of interest for publication.

Animal diseases transmitted to humans in Denmark during the year 1911:

Actinomycosis, 3 cases, all fatal (only ones reported).

Anthrax, 12 cases, all were people assisting in the killing. One case was accompanied by general infection, but recovered; one case proved fatal.

Foot and Mouth Diseases, 3 cases in children appearing as vesicular stomatitis with discolorations of gingivas.

Cow Pox, one case.

Transmission of Tricophytina and similar diseases, mostly from cattle and especially from calves, were reported from all parts of the country.

Respectfully,

H. RASMUSSEN, D.V.M.

Chicago, Ill., May 12, 1914.

Editors, AMERICAN VETERINARY REVIEW, *New York:*

At a special meeting of the Executive Committee of this association at Chicago, May 6, 1914, following resolution was passed and ordered transmitted to all live stock and farm papers on our mailing list:

RESOLUTION TO FARM PAPERS.

" That it is recognized no drug or drugs have yet been discovered which are specific for the cure of hog cholera.

" Therefore, this association respectfully requests agricultural papers to refrain from advertising such so-called cures."

This is in line with a nation-wide campaign we have started

against impure and improperly manufactured hog cholera serum and so-called drug and chemical hog cholera remedies.

If you join forces with us in this campaign it may cost you a little money in the way of lost advertising contracts, but such loss will be more than compensated for in the knowledge that you are protecting the health of swine on the farm and the best interests of their owners. Yours very truly,

J. J. FERGUSON, Secretary-Treasurer.

VETERINARIAN OLAF SCHWARZKOPF GOES TO THE BORDER.—In a recent letter from our esteemed friend and collaborator, Veterinarian Olaf Schwarzkopf, 3d cavalry, instructor at the mounted service school at Fort Riley, Kansas, we learn that the mounted service school is closed on account of threatened war, and that the doctor is leaving for the border to guard the Rio Grande. We sincerely hope that neither he nor any of our colleagues in the service suffer any undue hardship should hostilities eventually begin.

VETERAN AMBULANCE HORSE RECEIVES BLUE RIBBON FROM NEW YORK ROAD DRIVERS' ASSOCIATION.—On May 2, Mr. Wolf, president of the New York Road Drivers' Association, paid a high tribute to "Duke," the aged sorrel horse, who for nine years has drawn the ambulance of the Washington Heights (New York City) Hospital, and on concluding, pinned a blue ribbon to his bridle. "Duke" attracted especial public notice and admiration during the recent heavy snowfalls in February by performing his duties when all motor ambulances were useless. During one of those days when the weather conditions were at their worst (so bad that the fire apparatuses could not be moved, and firemen went at least to one fire by subway train service) "Duke" made four trips with his ambulance to Inwood Hill, a distance of two and a half miles each way, each trip, climbing a steep hill half a mile in length each time. Although Mr. Wolf knew and admired "Duke" previously, it was those recent achievements, in which he demonstrated the greater reliability of the horse over mechanical apparatus, that actuated him into having that faithful old horse with his ambulance brought before the judges' stand on the occasion of the road drivers' parade that he might publicly demonstrate his recognition of merit.

OBITUARY.

EGBERT LE FEVRE, B.A., M.D.

Dr. Egbert Le Fevre, died the end of March at the age of fifty-five, at the summit of his medical achievement. He received his medical degree thirty-one years ago at the age of 24 years, and at the age of 30 years he was made a lecturer in the New York University Medical College and never ceased to teach from that time, having been dean of the medical school since 1887. Dr. Le Fevre was a man once seen always remembered, and once known, always loved. His generosity knew no bounds. He always was ready to put himself aside in the interest of another, and his students adored him and eagerly listened to his words of wisdom. His personality was most striking; a giant in stature, full bearded, and possessed of that gentleness and modesty that characterizes greatness. While his duties in the medical school precluded the possibility of his following up the general practice of medicine, he was constantly sought in consultation, and would never refuse a call from anyone that he thought needed him, and from whom he would collect no fee for his services.

Dr. Le Fevre fully appreciated the value of veterinary medicine, and was always much interested in the veterinary school and veterinary students of New York University. His towering form will be missed on the campus at the commencement exercises this month, and his absence leaves a terrible vacancy in the medical faculty.

CHARLES JAMIESON, D.V.S.

Dr. Charles Jamieson died at his home in Brooklyn, N. Y., the middle of May, 1914. Dr. Jamieson, who was about fifty years old, graduated from the American Veterinary College in 1889, and immediately began general practice in that portion of Brooklyn called East New York. Quiet and unassuming, and always attentive to his work, he built up a nice practice, which he retained up to the time of his death. Dr. Jamieson was a member of the New York State Veterinary Medical Society and of the Veterinary Medical Association of New York City; both of which he attended pretty regularly. His health had not been good for a year or two. He leaves a family.

SOCIETY MEETINGS.

MISSISSIPPI STATE VETERINARY MEDICAL ASSOCIATION.

The eighth annual meeting of the M. S. V. M. A. was held in Jackson, Miss., at the Court House May 11, 1914. The meeting was called to order by the president, Dr. B. M. Leigh, at 9.30 a. m.

The following members responded to the roll call: Dr. B. M. Leigh, Dr. Oliver, Dr. Brock, Dr. Lewis, Dr. Heiney, Dr. Townsend, Dr. Norton, Dr. Beavers, Dr. Smith, Dr. Keller, Dr. Chadwick and Dr. Edwards.

The minutes of the last meeting were read and approved.

Dr. Oliver moved that business be suspended, so that the election of officers might take place. The following officers were elected: Dr. J. A. Beavers, Canton, Miss., president; Dr. W. L. Gates, Clarksdale, Miss., vice-president; Dr. J. D. Townsend, Louisville, Miss., secretary and treasurer.

On motion of Dr. Oliver the election of officers for the examining board was declared in order. Those appointed by the Governor were: Dr. Wm. P. Ferguson, Grenada, Miss.; Dr. O. M. Norton, Greenville, Miss. Those appointed by the association were: Dr. E. M. Ranck, state veterinarian, A. & M. College, Miss.; Dr. John Oliver, Columbus, Miss.; Dr. Lewis, Hattiesburg, Miss.

The executive committee reported favorably on the following applications for membership in the association: Dr. Frank Hecker, Dr. S. E. Osborn, Dr. Frank Henry, Dr. E. S. Norton, Dr. Wm. L. Gates, Dr. Wm. J. Hossley, Dr. Sim. J. Horne, Dr. T. B. Lee, Dr. E. C. Riddell, Dr. Geo. P. Sand, Dr. W. O. Ney, Dr. J. F. Barnett. The association voted favorably on these gentlemen, and they were declared members of the association.

A contribution was taken for funds to help defray expenses of the A. V. M. A. at the next meeting in New Orleans in December, which was responded to liberally by all present.

After the business session was over, Hon. Swep. Taylor, mayor of Jackson, delivered an address of welcome to the association which was brilliantly given and enjoyed by every one present. The mayor's address was responded to by Dr. Leigh and Dr. Ranck, thanking him for his many kindly remarks.

The state veterinarian, Dr. E. M. Ranck, called for a report from the assistant state veterinarians of their work in the past year, which showed a rapid improvement in conditions general over the state.

After a number of interesting discussions by the several different members of the association, the meeting adjourned to meet in Vicksburg. Time to be announced later.

J. D. TOWNSEND, M.D.C., Secretary and Treasurer.

AN ACT REGULATING THE PRACTICE OF VETERINARY SURGERY, MEDICINE AND DENTISTRY IN MISSISSIPPI.

Be it enacted by the Legislature of the State of Mississippi:

Section 1. That no person shall practice veterinary medicine or veterinary surgery in any of their departments, including veterinary dentistry, within this state, unless and until such person shall have complied in all respects with the provisions of this act.

Section 2. That there shall be a Board known as the State Board of Veterinary Examiners, composed of five members, who shall serve as follows: Two for two years, two for three years and one for four years. Said Board shall be selected as follows: The Governor of the State shall appoint two of said Board, and the State Veterinary Medical Association shall select three of said Board. All vacancies caused by death, resignation or removal shall be filled by the Mississippi State Veterinary Medical Association. No one can serve as a member of said Board unless he is a licensed or graduate veterinarian.

Section 3. There shall be no obligation on the part of the State of Mississippi for the payment of any money as salary or otherwise to any member of said Board, but the compensation and expenses of said Board shall be paid out of the fees and fines as hereinafter provided for. The members of said Board shall receive as compensation for their services the sum of five dollars per day for every day in actual service of the Board, and in addition thereto their actual expenses incident to the meeting of said Board. Provided, however, the said fines and fees collected under this act shall be sufficient to pay all expenses and salaries. If said fines and fees are not sufficient then the amount collected shall be pro rated among the members of said Board, after first paying the expenses of said Board.

Section 4. To provide that no person in Mississippi shall append to his name any initial or title implying qualifications of or assume or use the title of veterinarian, veterinary surgery or dentist, unless such degree has been conferred by a recognized veterinary college at the time this act is passed, and he or she shall have received a license or permit from the State Board of Examiners to practice.

Persons in Mississippi holding diplomas from a reputable veterinary college at the time this act is passed shall not be required to take the examination, but may be registered upon the payment of a fee of $2, and upon their submitting their diplomas to the Board for their examination. All others shall be required to take the Board examination and to pay a fee of $10 to the said Board when applying for license. Which said fee of $10 shall not be returned to said applicant whether he passed said examination or not.

Persons having practiced veterinary medicine in Mississippi as a means of livelihood for two years immediately preceding the passage of this act are permitted to continue in practice when registering.

Section 5. The Board shall elect from their members a Secretary, and any one wishing to stand the examination for license to practice veterinary

medicine or dentistry shall make application to said Secretary. The regular meetings of said Board shall be held on the third Tuesday in June of each year in the city of Jackson, Miss., when all examinations for license shall be held. All examinations shall be held under the rules and regulations to be adopted by the Board. If the applicant is found worthy and competent by the Board it shall issue to him a certificate of license to practice veterinary medicine, surgery and dentistry in this State. The Board may grant a certificate or temporary license to any applicant applying before the time of the regular meeting of the Board, provided said application is accompanied by the application fee of $10, said applicant furnishing satisfactory evidence that he possesses the necessary qualifications. Said temporary license shall entitle the holder thereof to practice until the next regular meeting of said Board when he may appear and take the regular examination. And it is further provided that the applicants examined and licensed by a reputable State Board of Veterinary Medical Examiners of other States, and holding a diploma from a recognized veterinary college and on payment of a fee of $10, and filing with said Board a copy of said license certified by the President and Secretary of said Board of such other State, shall, without further examination by the Board of this State, receive a license to practice veterinary medicine, surgery or dentistry.

Section 6. That any person desiring to practice veterinary medicine, surgery or dentistry in this State, shall make application for license to said Secretary of said Board of Examiners upon blanks furnished him by said Secretary for such purpose.

Any person receiving a license from said Board shall forthwith have same recorded in the office of the Circuit Clerk of the County in which he intends to practice, or makes his home.

Section 7. The Circuit Clerk of each County shall keep a complete list of the licenses recorded by him, together with the date of each and the date recorded. He shall further record the name of the veterinary college which conferred the diploma on which the license is based and the dates when such diploma was conferred.

Section 8. The Board shall have the right and power to revoke any license upon evidence that same was procured by fraud or that the holder of the license has been guilty of unprofessional or dishonorable conduct.

Section 9. Any person who practices or attempts to practice veterinary medicine, surgery or dentistry in this State without first having complied with all the provisions of this act shall for each and every offense be guilty of a misdemeanor and upon conviction thereof shall be fined not less than twenty-five dollars or more than two hundred dollars.

Section 10. Any person shall be regarded as practicing veterinary medicine, surgery or dentistry who shall treat, operate on or prescribe for any domesticated animal for which he receives compensation directly or indirectly. But nothing in this act shall prohibit any one from dehorning, castrating or spaying without a license.

Section 11. The Grand Jury of each County in this State is hereby given inquisitorial power over all offenses against or in violation of this act and the Circuit Judges of the State shall give the same in their charges to the Grand Juries.

This act shall be in force and effect from and after its passage.

RESOLUTIONS PASSED AT A SPECIAL SESSION OF THE EXECUTIVE COMMITTEE OF THE U. S. LIVE STOCK SANITARY ASSOCIATION AT CHICAGO, MAY 6, 1914.

WHEREAS, Hog cholera gives promise of being extremely prevalent during the coming season; and

WHEREAS, Reliable hog cholera serum as produced under the Dorset-McBride-Niles system is of great value in controlling and suppressing the disease;

WHEREAS, It has come to the knowledge of this Committee that many hog cholera serum plants are in operation in various States, which plants are not licensed by the United States Department of Agriculture nor under Federal or State supervision;

WHEREAS, We believe there is much serum being placed upon the market which may be absolutely unreliable and a detriment to hogs upon which it is used;

WHEREAS, Attention has been further directed to the placing on the market of fictitious serum, which in some cases is known not to have contained any animal serum;

THEREFORE BE IT RESOLVED THAT, All State authorities be advised to adopt regulations whereby all hog cholera serum plants may be inspected and their products supervised as herewith recommended, and when so supervised their products recommended as consistently as may be deemed advisable by State official;

They shall maintain entirely separate equipment for the handling of serum and virus; and

All equipment, containers, machinery, instruments and other apparatus used in the preparation of viruses and serums shall be thoroughly sterilized before use by live steam at a temperature of at least 120 degrees centigrade for not less than half an hour, or exposed to dry heat of at least 160 degrees centigrade for at least one hour. If for any reason such sterilization cannot be applied, then a process known to be equally efficacious in destroying micro-organisms may be substituted.

They shall keep separate temperature and number records of all hogs entering into the manufacture of serum and virus and the testing of serum;

All premises used for the production and testing of serum or virus shall be properly ventilated, lighted and maintained in a sanitary condition, so located as to avoid the spread of the disease and with suitable arrangements for the disposal of refuse.

All products shall be stored in a cold chamber or refrigerator for preservation until such time as they are removed from the premises.

Virus used for simultaneous treatment must be collected only from hogs which are inoculated by the establishment.

The temperature of supposedly virus hogs should not be accepted as proof of hog cholera unless supported by postmortem examination.

The indiscriminate distribution and sale of virus should be prohibited and its use limited to graduate veterinarians who have had special training in the proper and careful use of virulent blood, and duly authorized to use the same.

Each container should show the firm name of the manufacturer and true name of product and date of manufacture.

The simultaneous method should be used only in infected localities, except in cases of recorded breeding herds and then only under direction of State officials.

The importation of hogs be prohibited unless accompanied by a certificate of health issued by a duly accredited veterinarian certifying that such hog is from an uninfected territory or in case of vaccinated hogs that the same have received the serum-virus treatment at least 30 days prior to entry and the animal dipped immediately prior to shipment in a compound solution of cresol, according to Government requirements.

The State authorities make arrangements with their respective State veterinary associations with a view to their adopting a schedule of fees covering the work of vaccination.

The operation of serum plants be under the direct supervision of a competent veterinarian or other professional man whose training and experience have fitted him for this work.

S. H. WARD, President,
JOHN J. FERGUSON, Sec'y-Treas.,
C. M. HARING,
F. S. BROOKS,
V. A. MOORE,
C. H. STANGE,
E. R. FORBES,
Executive Committee.

MAINE VETERINARY MEDICAL ASSOCIATION.

The quarterly meeting of the M. V. M. A. was held at the Bangor House, Bangor, April 8th. The meeting was called to order at 8.15 p. m. by the president, Dr. Jervis.

Roll call: Drs. C. L. Blakely; F. W. Boland; W. H. Corey; C. F. Dwinal; R. E. Freeman; F. W. Huntington; H. B. F. Jervis; A. Joly; W. H. Lynch; M. E. Maddocks; A. L. Murch; J. A. Ness; B. L. Pratt; W. H. Robinson; F. L. Russell; E. E. Russell; C. L. Ryan; I. L. Salley; H. L. Stevens; H. B. Wescott.

The report of the January meeting was read and accepted.

Dr. Jervis appointed Drs. C. L. Blakely and W. H. Lynch a committee to draw up resolutions on the death of Dr. C. H. McGillicuddy, of Bath, who died January 24, 1914. This committee reported later in the evening and their resolutions were adopted by the association. Dr. Lynch made a motion that a committee be appointed to draw up some resolutions endorsing the office of Live Stock Inspector, this was seconded, and Dr. Jervis appointed Drs. Lynch, Ness and Blakely to serve on this committee. The committee reported later, but as this report was not handed to the secretary he is unable to report it.

Dr. J. A. Ness read a paper on "*Breeding Draft Horses in Maine.*" This paper was very interesting and brought forth much discussion. Dr. A. Joly read a paper on the "*Live Stock Industry in Maine;**" it was interesting and was discussed freely. Dr. Jervis gave a short talk on *Meat Inspection.*

It was voted to hold the next meeting at Houlton, July 3 and 4.

H. B. WESCOTT, Secretary.

Whereas, In the passing of Dr. Charles H. McGillicuddy from our Association and beyond our mortal sight, we are again reminded of the uncertainty of life, and the certainty of the day coming in which we shall all lay down our tasks, at whatever stage of completeness or incompleteness they may be.

Therefore be it resolved, That we mourn the early death of Doctor McGillicuddy as a useful member of society, a factor in the well being of his community, a valued member of his profession, always having the interests of the Association at heart when failing health often detained him from the meetings, still keeping as much in touch with us as was possible to the end.

Resolved, That the members of the Maine Veterinary Medical Association and those to whom his qualifications were best known and appreciated, offer this sincere tribute of deepest regard to the memory of the days when Dr. McGillicuddy shared our interests and our efforts.

Resolved, That we tender to his family our heartfelt condolence in their great loss, and be it further resolved that a copy of these resolutions be sent to them; and another copy be spread upon our records; a copy to the AMERICAN VETERINARY REVIEW and one to the Chicago *Veterinarian.*

W. H. LYNCH, D.V.S.,
C. L. BLAKELY, M.D.V.,
Committee.

* Published in present issue, page 323.

TWIN CITY VETERINARY ASSOCIATION, MINNEAPOLIS AND ST. PAUL.

The Twin City Veterinary Association, as reorganized last fall, has continued monthly meetings during the winter and recently finished the regular schedule on April 16, 1914.

These meetings have been more in the nature of a special study course than ordinary veterinary association meetings. Each program has been given to a thorough study of some one important subject.

On account of Montana dourine developments during the past year or so, and possibility of trouble for northwestern States, the first program was given entirely to the subject of dourine. The feature of the evening being an address by Dr. Miller, a dourine expert of the Bureau of Animal Industry.

Another program was given entirely to a study of vaccines and serum therapy, including an address by Dr. M. P. Ravenel.

Another program was given entirely to the subject of pneumonia, including anatomy, physiology, histology and pathology as illustrated by especially prepared charts. This gave the foundation for the program. Other addresses covered diagnosis, pneumonia in city practice, pneumonia in country practice, pneumonia in small animals, infectious pneumonia of swine, etc.

The meeting scheduled for May was in the form of a social gathering, concluding with a banquet to which ladies were invited.

M. H. REYNOLDS,
Secretary.

WESTERN NEW YORK VETERINARY MEDICAL ASSOCIATION.

On April 9, 1914, the veterinarians of Western New York met at the Hotel Statler, Buffalo, N. Y., and formed what is called the WESTERN NEW YORK VETERINARY MEDICAL ASSOCIATION.

The meeting was called to order by Dr. Hinkley, of Buffalo, and after a few moments the members were addressed by Dr. Moore, director of the New York State Veterinary College (Ithaca), who gave a very inspiring talk on the value of the formation of a veterinary medical association in this end of the State and offered to do all that he was able to make it a success. Dr. Hollingworth, of Utica, put aside his duties as a veterinarian

and made a special trip to Buffalo to help found the association. He delivered several short addresses, which were received with very much enthusiasm; and there is no doubt but that we will profit by his suggestions. Besides having the above noted visitors we were fortunate in also having with us Dr. Switzer, president of the State Society. Like the others, he also offered many good suggestions, and his speeches were filled with encouragement. The officers elected were Dr. E. Volgenau, of Buffalo, as president; Dr. J. L. Wilder, of Akron, as vice-president; and Dr. W. E. Fritz, as secretary and treasurer. Twenty-seven men were present, and no doubt at our next meeting, which will be the last Wednesday in June, we will be able to double our numbers.

Respectfully,
DR. W. E. FRITZ, Secretary and Treasurer.

RESOLUTIONS ADOPTED BY THE VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY, MAY 6, 1914.

RESOLVED, That the common watering trough is a menace to the health of horses in our city.

BE IT FURTHER RESOLVED, That we recommend the abolition of watering troughs and common pails.

AND WE FURTHER RECOMMEND, The substitution of the hydrant with running water or any other sanitary means of having fresh running water; and that,

WE FURTHER RECOMMEND, That each driver have individual pails for each horse, and that a penalty be fixed for any driver using anything other than the horses own pail.

Chas. V. Noback, 1976 Belmont Ave., New York City, Chairman; Chas. E. Clayton, 207 West 55th St., New York City; E. B. Ackerman, 265 Greene Ave., Brooklyn, N. Y.; D. W. Cochran, 19 Vestry St., New York City; Geo. J. Goubeaud, Farrington St. and Broadway, Flushing, L. I., N. Y.; R. W. Ellis, 477 West 150th St., New York City; Committee on Resolutions.

ILLMO VETERINARY MEDICAL ASSOCIATION.

The Illmo Veterinary Medical Association held its 3d meeting in Belleville, Ill., March 26th. Every one able to attend the meeting joined, and the association now has 40 members. All

took active interest in the meeting. An interesting program was rendered at the city hall in the afternoon and evening. The clinic consisted of the following:

Chloroforming in the standing position, by Dr. L. B. Michael, of Collinsville, Ill., who highly recommends it, and stated that he'd as soon chloroform a horse as to cast him.

Passing of the stomach tube, by Dr. W. R. Michael, Highland, Ill.

Firing of chronic tendonitis, by A. Darling, St. Louis, Mo.

Also several extraordinary cases were exhibited.

Next meeting place will be in East St. Louis, Ill., July 17, 1914. L. B. MICHAEL, Sec'y.

NEW YORK STATE ORGANIZES ANOTHER VETERINARY ASSOCIATION.—Through the courtesy of Dr. Walter E. Fritz, the secretary and treasurer of the said association, we have published the meeting of organization in Buffalo, April 9, 1914. The association proposes to comprise in its territory the counties of Erie, Niagara, Orleans, Genesee, Wyoming, Cattaraugus, Chautauqua and Allegheny. It made a good healthy beginning with twenty-seven members, and we predict a strong organization, and congratulate the veterinarians of Western New York on their accomplishment.

DR. E. B. ACKERMAN, OFFICIAL REPRESENTATIVE OF NEW YORK CITY DEPARTMENT OF HEALTH AT LONDON CONGRESS.—Dr. E. B. Ackerman, Chief Veterinarian to the Health Department of New York City, will sail for Europe on July 10th, on the St. Paul, of the American Line (constituting a supplementary official tour of the American Veterinary Medical Association), as an official representative of the New York City Department of Health, at the 10th International Veterinary Congress, London, August 3 to 8, 1914. Dr. Ackerman will also officially visit the Pasteur and other laboratories, also stock yards and abattoirs of the several cities he visits, making a study of the methods of the control of contagious diseases, and gathering any other facts that he may deem of interest and value to his department. He will meet the other party in London, probably returning with them late in August. It is quite probable that the New York State Department of Agriculture may send Dr. John F. DeVine as their official representative on a similar mission.

NEWS AND ITEMS.

NEW WORK ON DISEASES OF POULTRY.—We are recently in receipt of a new work on *Diseases of Poultry*, by Prof. B. F. Kaupp, Commissioner of Public Health, Spartanburg, S. C., the result of several years' hard work, both in field and laboratory. We have not been able to review the work in time for this issue, but hope to in the near future.

ADDRESSES OF THE FOLLOWING MEMBERS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION ARE DESIRED.—J. O. Connor, J. M. Courtright, J. T. Dinwoodie, C. O. Durfee, W. J. Embre, H. C. Fischer, A. V. Hall, Frank Hecker, Julian Howard, J. H. Jacobs, A. G. Johnson, E. I. Lollar, O. E. McKim, R. W. MacDonald, Henry Marshall, M. C. Wiley, P. E. Wood, A. H. Quin.*

N. S. MAYO, Secretary, A. V. M. A.
4753 East Ravenswood Ave., Chicago, Ill.

STEREOPTICON LECTURE AT JUNE MEETING OF THE VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY.—The Luray Caverns in the Shenandoah Valley, with all their beauty and wonder, and beautiful scenery along the Norfolk and Western Railway, will be some of the things that will be thrown on the screen at a lecture to be given at the June meeting of the above association at 141 West 54th street, on Wednesday evening, June 3, 1914. All veterinarians are invited.

THE COMMENCEMENT ADDRESS OF THE KANSAS CITY VETERINARY COLLEGE was this year delivered by Dr. Nelson S. Mayo, Secretary of the American Veterinary Medical Association, and we congratulate the graduating class of 1914 in having had that earnest, eloquent gentleman address them. They cannot measure the good that will come to them in after-life from the inspiring words that were said to them in Dr. Mayo's address, that it has been our great pleasure to read in *The Alumnus*, Vol. 1, No. 10. Men like Mayo do much by their personality and earnest words of wisdom in starting the characters of young practitioners to form in the proper molds.

DEPARTMENT OF AGRICULTURE REPRESENTATIVE DISCUSSES GLANDERS.—Dr. H. D. Gill, of the New York State Department of Agriculture, upon request, attended the Keystone Veterinary Medical Association in Philadelphia in May to discuss means for the control of glanders. He also recently appeared before the Bronx County Grand Jury on orders from the Commissioner of Agriculture to elucidate some points on sanitation before that body.

THE ILLMO VETERINARY MEDICAL ASSOCIATION will hold its next meeting July 17, 1914, at East St. Louis, Ill., at the National Stock Yards Hotel. A special effort is being made to secure a good program and Secretary Michael states that the replies received from good men in the profession who are to contribute to the program are very gratifying. We are informed that there are about 200 eligible men in the territory that this organization embraces, and hope that every one of them will attend the July meeting and join the association.

COPIES OF PROCEEDINGS OF FIFTIETH ANNIVERSARY MEETING OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION may be obtained by writing the librarian of the association, Dr. J. N. Frost, Ithaca, N. Y. The cost is $3. The publication of the foregoing information has been prompted by the numerous inquiries that have come into the REVIEW office as to whether or not it was possible for any one, other than a member of the A. V. M. A., to obtain a copy of the proceedings. Our understanding is that anyone may obtain a copy by paying the cost of production, which has been estimated at $3. Of course the actual *value* of the proceedings of the 1913 meeting of the A. V. M. A. in New York far exceeds that amount, as its 1,100 pages not only contain valuable papers by the leading members of our profession, and discussions of the same, but it is a souvenir number; and marks the fiftieth milestone of veterinary progress in America.

FIELD VETERINARIAN FOR MINNESOTA LIVE STOCK SANITARY BOARD.—Dr. Harry Evenson has been appointed a field veterinarian to the above board, with headquarters at Olivia, Minnesota. The board, in co-operation with the B. A. I., are endeavoring to control hog cholera.

CONFERENCE ON BOVINE TUBERCULOSIS.—The following statement from the Department of Agriculture, Albany, New York, Tuesday, May 12, 1914.

Concluding a conference at the State Department of Agriculture to-day upon the question of restricting and eliminating bovine tuberculosis in New York State, a resolution was unanimously adopted asking Governor Martin H. Glynn to name a commission to investigate the subject and report with recommendations of legislation to the Governor before the convening of the legislature of 1915. Governor Glynn was requested to name Commissioner Calvin J. Huson, Dr. V. A. Moore, dean of the State Veterinary College at Ithaca, and Seth Low, of New York City, as three members of the commission, together with such others as he deems advisable.

Twenty answered Commissioner Huson's call to come to Albany and discuss the situation in this State with regard to bovine tuberculosis. It seemed to be the sense of the meeting that the present law providing for the condemnation of animals found to be infected with tuberculosis, and either their slaughter under inspection or isolation under what is known as the Bang system has not resulted in such elimination of the disease as had been hoped. The Wheeler-Machold bill, designed to supplant the present law, which passed the senate at the last session but was killed in rules committee in the assembly, was endorsed by the meeting and will be recommended to the new commission as a basis upon which to build the new bill.

Attending the conference were: Paul E. Taylor, secretary of the New York Milk Committee; Dr. Charles E. North, president of the committee; Dr. E. B. Ackerman, New York City Health Department; G. D. Brill, representing Seth Low; F. D. Walmsley, Utica; F. D. Holford, Albany; E. A. Powell, Syracuse; A. L. Brockway, Syracuse; Dr. V. A. Moore, Ithaca; Prof. H. H. Wing, Ithaca; Dr. F. M. Meader, representing the State Health Department; Dr. W. H. Jordan, Geneva Experiment Station; Dean H. E. Cook, State Agricultural School, Canton; State Senator F. N. Godfrey; Edward Van Alstyne, director of Farmer's Institutes; Harry Winters, deputy commissioner of agriculture; G. L. Flanders, counsel to the agricultural department; Dr. J. G. Wills, chief veterinarian; Dr. J. H. Devine, consulting veterinarian; Dr. Charles Linch, assistant veterinarian; and Commissioner Calvin J. Huson.

TOM BOYNTON PECK,
Secretary.

VETERINARY MEDICAL ASSOCIATION MEETINGS.

In the accompanying table the data given is reported by many Secretaries as being of great value to their Associations, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list :

Name of Organization.	Date of Next Meeting.	Place of Meeting.	Name and Address Secretary.
Alabama Veterinary Med. Ass'n	Mar. 5-6-7, 1914	Auburn	C. A. Cary, Auburn.
Alumni Ass'n, N. Y.-A. V. C.	June 10, 1914	141 W. 54th St.	P. K. Nichols, Port Richmond, N.Y.
American V. M. Ass'n.	Dec., 28-31, 1914	New Orleans, La	Nelsen S. Mayo, 4753 Ravenswood Ave., Chicago, Ill.
Arkansas Veterinary Ass'n	January 5-6, 1915	Little Rock	R. M. Gow, Fayetteville.
Ass'n Médécale Veterinare Française. "Laval"	1st and 3d Thur. of each month	Lec. Room, Laval Un'y, Mon.	J. P. A. Houde, Montreal.
B. A. I. Vet. In. A., Chicago	2d Fri. each month.	Chicago	H. A. Smith, Chicago, Ill.
B. A. I. Vet. In. A., So. Omaha	3d Mon. each month.	S. Omaha, Neb.	E. J. Jackson, So. Omaha.
Buchanan Co. Vet. Ass'n.	Monthly.	St. Joseph	F. W. Caldwell, St. Joseph, Mo.
California State V. M. Ass'n	December 10, 1913.	San Francisco	John F. McKenna, Fresno.
Central Canada V. Ass'n.	Feb. and July	Ottawa	A. E. James, Ottawa.
Central N. Y. Vet. Med. Ass'n	June and Nov.	Syracuse	W. B. Switzer, Oswego.
Chicago Veterinary Society	2d Tues. each month.	Chicago	D. M. Campbell, Chicago.
Colorado State V. M. Ass'n	May 28-29, 1914	Ft. Collins	I. E. Newsom, Ft. Collins.
Connecticut V. M. Ass'n.	Aug. 4, 1914	Waterbury	B K. Dow, Willimantic.
Delaware State Vet. Society	Jan., Apl., July, Oct.	Wilmington	A. S. Houchin, Newark, Del.
Essex Co. (N. J.) V. M. A.	3d Mon. each month.	Newark, N. J.	J. F. Carey, East Orange, N. J.
Genesee Valley V. M. Ass'n	2d week, July, 1913.	Rochester	J. H. Taylor, Henrietta.
Georgia State V. M. A.	Dec. 22-23, 1913.	Atlanta	P. F. Bahnsen, Americus.
Hamilton Co. (Ohio) V. A.			Louis P. Cook, Cincinnati.
Illmo Vet. Med. Ass'n.	July, 17, 1914	E. St. Louis	L. B. Michael, Collinsville. Ill.
Illinois State V. M. Ass'n.	July 15, 1914	Springfield	L. A. Merillat, Chicago.
Indiana Veterinary Association	Jan. 14, 1914	Indianapolis	A. F. Nelson, Indianapolis.
Iowa Veterinary Ass'n.	Pending	Pending	C. H. Stange, Ames.
Kansas State V. M. Ass'n.	Jan. 6-7-8, 1914	Manhattan	J. H. Burt, Manhattan.
Kentucky V. M. Ass'n.	Oct. & Feb. each year.	Lexington	Robert Graham, Lexington.
Keystone V. M. Ass'n.	2d Tues. each month.	Philadelphia	Cheston M. Hoskins.
Lake Erie V. M. Association	Pending	Pending	Phil. H. Fulstow, Norwalk, Ohio.
Louisiana State V. M. Ass'n.	Sept., 1914	Lake Charles	Hamlet Moore, New Orleans, La
Maine Vet. Med. Ass'n.	July 3, 4, 1914	Houllon	H. B. Wescott, Portland.
Maryland State Vet. Society		Baltimore	H. H. Counselman, Sec'y.
Massachusetts Vet. Ass'n	4th Wed. each month.	Young's, Boston.	J. H. Seale, Salem.
Michigan State V. M. Ass'n.	Feb. 3, 4, 1914	Lansing	W. A. Ewalt, Mt. Clemens.
Minnesota State V. M. Ass'n.	Jan. 14-15-16, 1914.	St. Paul	G. Ed. Leech, Winona.
Mississippi State V. M. Ass'n.	1914	Vicksburg	J. D. Townsend, Louisville.
Missouri Valley V. Ass'n.	Jan. 27, 28, 29, 1914	Kansas City, Mo.	Hal. C. Simpson, Denison. Ia.
Mississippi Valley V. M. Ass'n	Semi-Annually	Galesburg, Ill.	G. E. McIntyre, Alexis, Ill.
Missouri Vet. Med. Ass'n.	July, 1913	Kirksville	S. Stewart, Kansas City.
Montana State V. M. A.	Sept. 24, 25, 1913.	Helena	A. D. Knowles, Livingston.
Nat'l Ass'n B. A. I. Employees	2d Mon. Aug., 1914.		S. J. Walkley, 185 N. W. Ave., Milwaukee, Wis.
Nebraska V. M. Ass'n.	1st Mo. & Tu., Dec. '13	Lincoln, Neb	Carl J. Norden, Nebraska City.
New York S. V. M. Soc'y.	August 11-12-13, 1914	Rochester	H. J. Milks, Ithaca, N. Y.
North Carolina V. M. Ass'n.	June, 23, 1914.	Wilson	J. P. Spoon, Burlington.
North Dakota V. M. Ass'n.	Week of July 20, 1914	Fargo	A. F. Schalk, Agricultural College.
North-Western Ohio V. M. A.	Nov. 1913.	Delphos	E. V. Hover, Delphos.
Ohio State V. M. Ass'n.	Jan. 14, 15, 1914	Columbus	Reuben Hilty, Toledo.
Ohio Soc. of Comparative Med.	Annually	Upper Sandusky.	F. F. Sheets, Van Wert, Ohio.
Ohio Valley Vet. Med. Ass'n			J. C. Howard, Sullivan.
Oklahoma V. M. Ass'n.	Fall, 1913.	Oklahoma City.	C. E. Steel, Oklahoma City.
Ontario Vet Ass'n.	1st Week in Feb. 1914	Toronto	L. A. Willson, Toronto.
Pennsylvania State V. M. A.	Mar. 3, 4, 1914	Philadelphia	John Reichel, Glenolden.
Philippine V. M. A.	Call of President.	Manila	David C. Kretzer, Manila.
Portland Vet. Med. Ass'n.	4th Tues. each month.	Portland, Ore.	Sam. B. Foster, Portland, Ore.
Province of Quebec V. M. A.		Mon. and Que.	Gustave Boyer, Rigaud, P. Q.
Rhode Island V. M. Ass'n.	Jan. and June	Providence	J. S. Pollard, Providence.
South Carolina Ass'n of Veter'ns.	Pending	Pending	B. K. McInnes, Charleston.
South Illinois V. M. and Surg. Ass'n.	Aug. 4-5-6 1914	Salem	F. Hockman, Iola.
St. Louis Soc. of Vet. Inspectors	1st Wed. fol. the 2d Sun. each month.	St. Louis	Wm. T. Conway, St. Louis, Mo.
Schuylkill Valley V. M. A.	June 17, 1914	Reading	W. G. Huyett, Wernersville.
Soc. Vet. Alumni Univ. Penn.		Philadelphia	B. T. Woodward, Wash'n, D. C.
South Dakota V. M. A.	Pending	Madison	S. W. Allen, Watertown.
Southern Aux. of Cal. S. V. M. Ass'n.	Jan., Apl., July, Oct.	Los Angeles	J. A. Dell, Los Angeles.
South St. Joseph Ass'n of Vet. Insp.	4th Tues. each month	407 Illinois Ave.	H. R. Collins, South St. Joseph.
Tennessee Vet. Med. Ass'n.	November. 1914	Nashville	O. L. McMahon, Columbia.
Texas V. M. Ass'n	Nov., 1913.	College Station.	Allen J. Foster, Marshall
Twin City V. M. Ass'n.	2d Thu. each month.	St. P.-Minneap.	M. H. Reynolds, St. Paul, Minn.
Utah Vet. Med. Ass'n.	Spring of 1914	Salt Lake City.	E. J. Coburn, Brigham City.
Vermont Vet. Med. Ass'n.			G. T. Stevenson, Burlington.
Veterinary Ass'n of Alberta			C. H. H. Sweetapple, For. Saskatchewan, Alta., Can.
Vet. Ass'n Dist. of Columbia	3d Wed. each month.	514 9th St., N.W.	M. Page Smith, Washington, D. C.
Vet. Med. Ass'n, Geo. Wash. Univ.	1st Sat. each month.	Wash'ton, D. C.	J. M. Cashell, 2115 14th Street.
Vet. Ass'n of Manitoba.	Feb. & July each yr.	Winnipeg	Wm. Hilton, Winnipeg.
Vet. Med. Ass'n of N. J.	January 8, 1914	Trenton	E. L. Loblein, New Brunswick.
V. M. Ass'n, New York City	1st Wed. each month.	141 W. 54th St.	R. S. MacKellar, N. Y. City.
Veterinary Practitioners' Club.	Monthly.	Jersey City	T. F. O'Dea Union Hill, N. J.
Virginia State V. M. Ass'n.	July 9-10 1914	Staunton	Geo. C. Faville, North Emporia.
Washington State Col. V. M. A.	1st & 3d Fri. Eve.	Pullman	R. J. Donohue, Pullman.
Washington State V. M. A.	June 18-19, 1914	Walla Walla.	Carl Cozier, Bellingham.
Western N. Y. V. M. A.	June 24, 1914	Buffalo	W.E. Fritz, 358 Jefferson St., Buffalo
Western Penn. V. M. Ass'n.	3d Thu. each month.	Pittsburgh	Benjamin Gunner, Sewickley.
Wisconsin Soc. Vet. Grad.	Feb. 10, 11, 1914	Milwaukee	W. W. Arzberger, Watertown
York Co. (Pa.) V. M. A.	June, Sept., Dec., Mar	York	E. S. Bausticker, York, Pa.

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